National Guidelines for the Management of Post-Partum Haemorrhage (PPH) for Pakistan

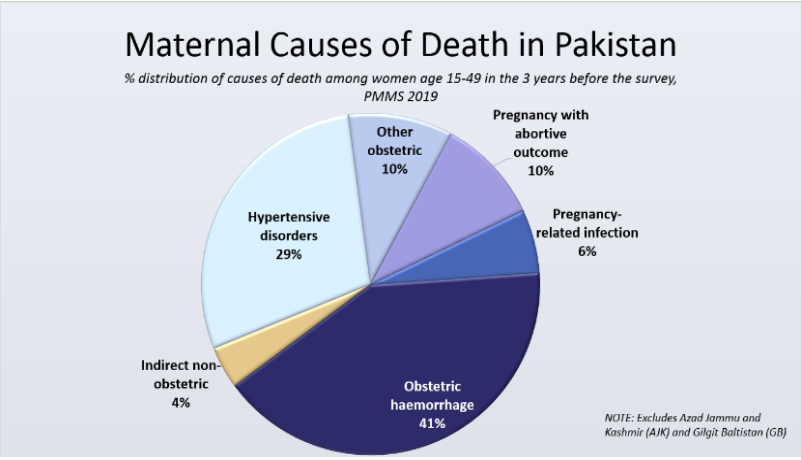
July 2023

National Committee for Maternal & Neonatal Health (NCMNH)
&
Association for Mothers & Newborns (AMAN)

Introduction

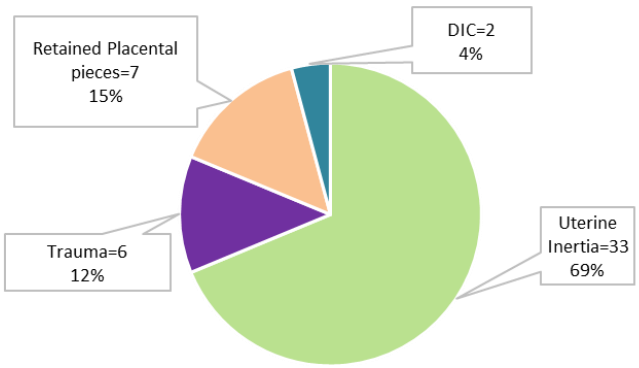
This guidance is evidence based, peer reviewed and will be updated as newer practice changing evidence is published

PPH is the leading cause of maternal deaths in Pakistan & worldwide. In depth analysis of Maternal deaths in Pakistan reveals Obstetric Haemorrhage as the leading cause (41%). PPH accounted for 89% and antepartum hemorrhage (APH) for 11% of obstetric haemorrhage deaths. (Ref. 1,2,3,4,5).



Highest number of deaths due to obstetric hemorrhage were reported in GB (58%) and KP (56%) followed by Balochistan (48%), Punjab (38%), Sindh (29%) and AJK (20%). Among the deaths due to PPH, 48 (96%) had primary PPH and 2 (4%) had secondary PPH. Uterine inertia was responsible for 69% of primary PPH

Maternal Deaths due to Primary Postpartum Hemorrhage (n=48)



Neglect and poor management in health facilities also contributed to deaths. Misadventures contributed to 93 (36%) maternal deaths and to 75% of deaths due to primary PPH.

Most deaths occur within 2 hours of delivery. Rapid action is critical for survival. Majority of women who experience PPH have no risk factors. Early recognition of this condition may result in saving many lives. Recent scientific evidence, (Figo guidelines 2022, Ref.6) and new technological developments have necessitated changes to the management of PPH in Pakistan in line with the guidelines from WHO, FIGO, ACOG, RCOG, FOGSI & other major International Obstetrics & Gynaecological professional bodies. PPH guidelines using Bundle approach of management with early detection, have helped improve the care of women around the world and their use should be followed in all health facilities in Pakistan as well.

Care bundles approach of management have been associated with improved patient outcomes. The goal of the **PPH bundle** is to reduce the frequency of severe hemorrhage and improve maternal outcomes. **The shock index** indicator, defined as the ratio of heart rate to systolic blood pressure (HR: SBP), is simple to use, and has better predictive ability than other vital signs because it detects acute changes in the maternal cardiovascular system and acts as an early marker to predict adverse outcomes. Anyone who attends a birth can be taught simple home-based life-saving skills.

Evidence-based prevention and management of PPH can be achieved with the **early accurate measurement of blood loss**, and **timely treatment**, (ref 6,7,8) **Early detection of PPH treatment triggers** include the use of Calibrated drapes for the collection of blood, with **trigger lines** at 300 ml and 500 ml for the first hour after birth.

Calling the 1st Bundle **"MOTIVE"** may help practitioners to help recall all the components, and not forget to give something (MOTIVE: Uterine Massage, Oxytocic drugs, Tranexamic acid, IV fluids, and Examination or Establish Cause and Escalation)

Post partum monitoring of blood loss, blood flow, uterine tone every 15 min documented on the blood-loss monitoring chart along with Blood pressure and pulse monitored once in the first hour post-partum. Trigger Criteria for treatment include clinical judgment of blood loss ≥500 ml, or blood loss ≥300 ml plus one abnormal observation

Any amount of bleeding after childbirth which causes cardiovascular compromise/ deterioration of vital signs should be considered PPH.

Primary Postpartum haemorrhage (PPH) is defined as blood loss > 500 mL within 24 hours after birth, **Secondary PPH** is > 500mls blood loss after 24 hours of childbirth. Further subdivisions are:

Minor PPH: 500-1000 mls

Moderate PPH: 1000-2000 mls

Severe PPH: 2000 mls or more

Problems with these definitions:

- Estimates of blood loss are notoriously low, often half the actual loss. Blood can be mixed with amniotic fluid and urine. It is dispersed on sponges, towels and linens, in buckets, and on the floor.
- The importance of a given volume of blood loss varies with the woman's hemoglobin level before she gives birth. A woman with a normal hemoglobin level will tolerate

blood loss that would be fatal for an anaemic woman. Anaemic women collapse and die from hypotension, therefore avoid hypotension with early insertion of a 14 G or 16 G IV cannula and fluid/ blood replacement

- Bleeding can occur at a slow rate over several hours; the condition might not be recognized until the woman is suddenly in shock. Risk assessment in the antenatal period does not effectively predict which women will have PPH
- **Even healthy, non-anaemic women can have catastrophic blood loss.**
- Trigger for initiating treatment is blood loss of 500mls, or earlier at 300 mls + one abnormal observation
- **We cannot predict who will experience PPH on the basis of risk factors alone**

Risk Factors: Over distended uterus (Twins, big baby, Polyhydramnios), Prolonged labour, antepartum hemorrhage (APH), Severe Pre-eclampsia / Eclampsia, Prolonged intrauterine death, C-section, previous C- section & **Anaemia**

Causes of PPH include: Uterine atony (most common)**,** retained placenta or fragments**,** tears of uterus, cervix, vagina, perineum**,** coagulation defects**,** inversion of uterus**,** infection (delayed PPH)

PPH PREVENTION

Antenatal Care should include minimum 8 contact visits, prevention, early detection & treatment of Iron deficiency **Anemia** & Thallasaemia

AMTSL (Active management of third stage of labour): Uterotonics for prevention of PPH during the third stage of labor is recommended for **all births**. **Oxytocin** (10 IU IV/IM) is the preferred uterotonic. Maintain **Oxytocin cold chain.**

In settings where oxytocin is unavailable or its quality cannot be guaranteed, other injectable uterotonics (if appropriate **Ergometrine/Methylergometrine** 200 µg IM/IV; (hypertensive disorders should be excluded prior to its use, maintain cold chain) or oral **Misoprostol** 400–600 µg orally (heat stable) or **Carbetocin** 100 µg IM/IV (heat stable) is recommended for the prevention of PPH

The **combinations** of ergometrine + oxytocin or **misoprostol + oxytocin** may be **more effective** uterotonic drug strategies for the prevention of PPH ≥500 ml compared with the current standard, oxytocin. This comes at the expense of a higher risk of adverse effects (vomiting & hypertension with ergometrine & shivering, fever with misoprostol)

In settings where skilled birth attendants (SBAs) are not present to administer injectable uterotonics, & oxytocin is unavailable, the administration of **Misoprostol** (400–600 µg orally) by community healthcare workers and lay health workers is recommended for the prevention of PPH

In settings where skilled birth attendants are unavailable, **controlled cord traction (CCT)** is not recommended

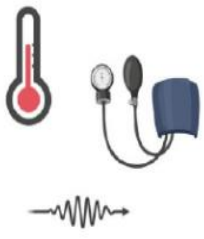
Sustained uterine massage is not recommended as an intervention to prevent PPH in women who have received prophylactic oxytocin

Postpartum per-abdominal uterine tone/ contraction assessment for early identification of uterine atony is recommended for all women

Oxytocin (IV or IM) & CCT is the recommended method for removal of the placenta for the prevention of PPH in vaginal and cesarean delivery. Delay Cord clamping for >2 mins and wait for signs of placental separation with CCT

Postpartum Care: Women should be **monitored closely (every 15 min) during the first hour after delivery**: check vaginal bleeding (**accurate blood loss measurement**), uterine tone, pulse and BP.

Postpartum monitoring (PPM) is recommended to ensure early identification and intervention in the case of complications.



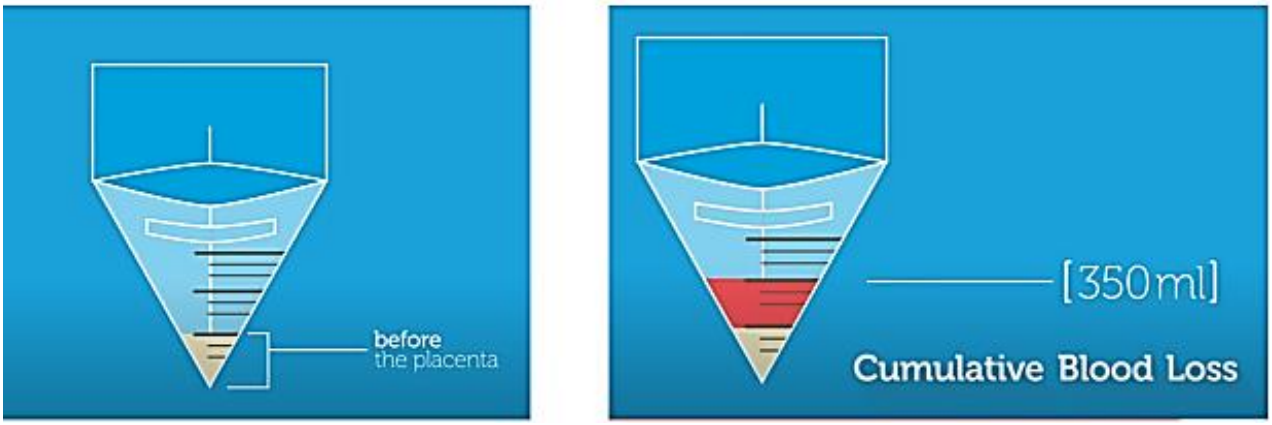
Recommended checks:
- Airway and breathing
- Circulation (blood pressure, pulse)
- Vaginal bleeding
- Uterine tone
- Consciousness/convulsions
- Abdominal pain
- Temperature

Recommended timing:
- *Every 15 minutes* from 0-1 hours after delivery
- *Every hour* from 1-4 hours after delivery
- *Every 4 hours* from 4-24 hours after delivery
- Conduct more thorough assessments at 1 hour and discharge

Source: WHO Integrated Management of Pregnancy and Childbirth Guidelines, 2014.
Image source: BioRender (2019).

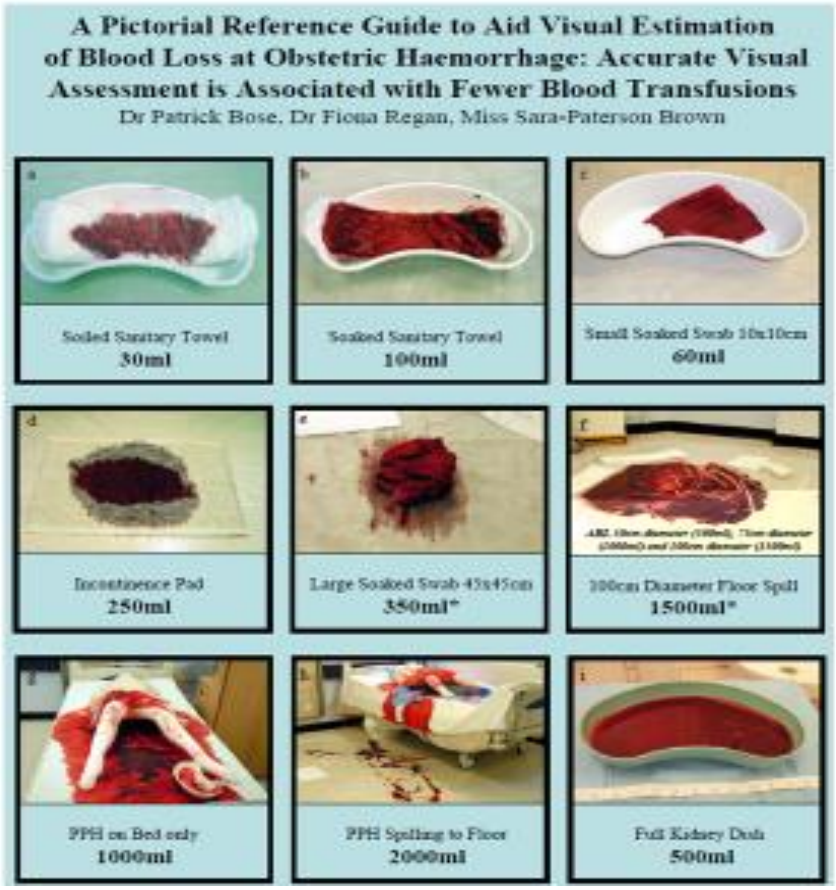
Methods of Blood loss Assessment (usually underestimated)

1. Measure blood loss with Under the buttock drapes



It is best to roll out (ie open the) the funnel of the calibrated under the buttock drape after the birth of the baby, but before the delivery of the placenta (to avoid amniotic fluid collecting in the drape and causing error in measurement)

2. Visual Assessment



3. Weighing swabs/ pads (1g =1 ml)

Weight of wet swabs in grams minus weight of dry swabs in grams = blood loss in mls.

RESPONDING TO PPH EMERGENCY

Responding to an emergency promptly and effectively requires that members of the clinical team know their roles and how the team should function. Organize an **Obstetrics rapid Response Team (ORRT)** in every duty shift. Team members should also know clinical situations, their diagnoses and treatments; medicines, how to use and their side effects; emergency equipment and how it functions.

The ability of a facility to deal with emergencies should be assessed & reinforced by frequent practice / simulation emergency drills.

When managing an emergency:

- Introduce yourself.
- Ask the woman her name; if she is unconscious, ask for the woman's name from her companion.
- Encourage the companion to stay with the woman.
- Explain all procedures; ask permission and keep the woman informed as much as you can about what you are doing. If the woman is unconscious, talk to her companion.
- Ensure and **respect** the woman's privacy during examination and discussion. **(Respectful Maternal Care)**
- Do not leave the woman unattended.
- Ensure that the emergency transport the woman used to get to the health facility is retained at the facility until a clear plan of management is in place.

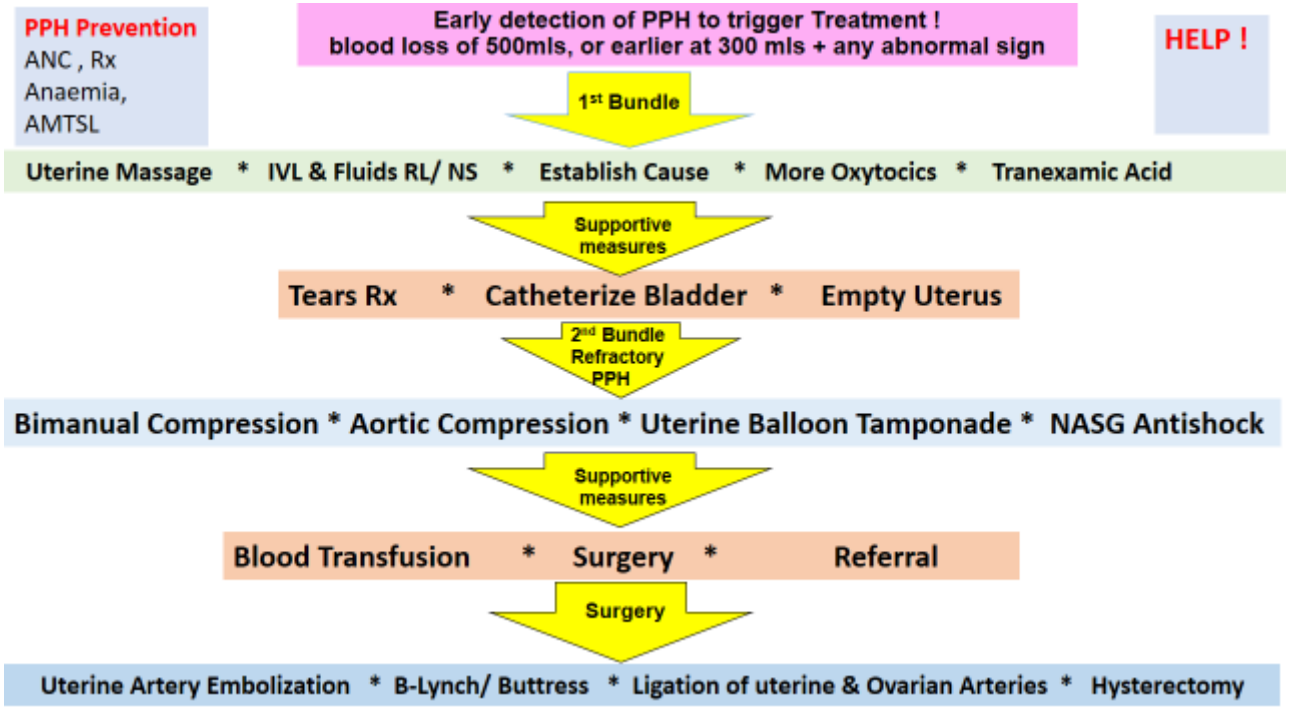
PPH TREATMENT

Treatment should start with the **"Bundle approach**". Use an **under the buttock plastic drape** for accurate measurement of blood loss with early detection of PPH. Action should be taken with 300 mls or even less blood loss when a woman is already anaemic (not wait for 500 mls blood loss)

First Action is **Call for Help** and start **Uterine massage**

PPH Management flow chart using Prevention, AMTSL, Early Detection & Bundle Approach

EMOTIVE



- **IV Oxytocin** alone is the recommended first-line uterotonic drug for the treatment of PPH
- **Oxytocin regimen recommended in E-MOTIVE:** 10 units in 500 mls normal saline, given rapidly (ie the bolus), over 10 mins (maintenance regimen: 20 units in 1000 mL normal saline, given over 4 hours)
- If oxytocin is not available, or if the bleeding does not respond to oxytocin, the use of IM ergometrine, **oxytocin–ergometrine fixed dose** (avoid in cardiac & hypertensive patients), or a prostaglandin (including **sublingual misoprostol, 800 µg**) is recommended
- There is no evidence about the safety and efficacy of an additional 800-µg dose of misoprostol for treatment of PPH, to women who have already received 600 µg of prophylactic misoprostol orally.
- **IV isotonic crystalloids** are recommended in preference to the use of colloids for the initial IV fluid resuscitation of women with PPH
- Early use of **IV Tranexamic acid (TXA)** as soon as PPH is diagnosed but within 3 h of birth in addition to standard care with clinically diagnosed PPH. 1 g (100 mg/ml) tranexamic acid slow IV at 1 ml/min (over 10 min); 2nd dose of 1 g IV if bleeding continues after 30 min, or if bleeding restarts within 24 h of completing the first dose. Caution: Do not mix TXA in the same infusion bag as Oxytocin as it may lead to decreased efficacy.
- Intramuscular TXA inhibits fibrinolysis within 10minutes and may be a suitable alternative to IV TXA when the Birth attendant is not skilled to give IV medication. IM TXA has been shown to be beneficial in prospective studies and is being studied in larger trials (Ref 9)

Initial Management when a woman presents with PPH:

- Stay calm. Think logically and focus on the needs of the woman.
- Take charge. Avoid confusion by choosing one person to be in charge.
- **SHOUT FOR HELP.** Have one person go for help and have another person gather emergency equipment and supplies (e.g. oxygen cylinder, emergency kit).
- If the **woman is unconscious**, assess the airway, breathing and circulation. Begin resuscitation of the woman, as needed (e.g. assist breathing, start intravenous infusion).
- **Early detection of shock** (e.g using the Shock Index & Rule of 30)

- If **shock is suspected**, immediately begin treatment. Even if signs of shock are not present, keep shock in mind as you evaluate the woman further, because her status may worsen rapidly. If **shock develops**, it is important to begin treatment immediately.
- Position the woman lying down on her left side with her feet elevated. Loosen tight clothing.
- Talk to the woman and help her stay calm. Ask her or someone with her what happened, what symptoms she is experiencing and when they started.
- Perform a **rapid evaluation** of the woman's general condition, level of consciousness, presence of anxiety and/or confusion, blood loss, colour, and temperature of skin
- Put in one or two large-bore IV cannulae/needles. (14 G gives 240 ml/min, 16 G gives 180 ml/min)
- Get blood samples before infusing IV fluids & for the Bedside Clotting test.
- Infuse IV fluids. Adjust the flow rate based on the woman's condition and potential risks of fluid overload (e.g. pre-eclampsia).
- Perform a rapid targeted history and physical examination to make a differential diagnosis of the problem.
- Stabilize the woman.
- Catheterize for monitoring urinary output and prevent a distended bladder
- Document history, findings, actions and plan for continued management

BASIC PRINCIPLES WHEN PROVIDING RESPECTFUL CARE

- Where feasible, ensure that the woman has a companion of her choice with her.
- Provide information to the woman and any accompanying family members the woman would like to be involved in decision-making— about diagnostic tests to be performed, supportive care to be provided (e.g. IV infusion), the process of care, her diagnosis, treatment options and the estimated time for in-patient care if required.
- If the woman is unconscious, explain the procedure to her family.
- Obtain informed consent for any procedures (diagnostic or therapeutic)
- **Note**: If the **woman is in shock**, avoid using plasma substitutes (e.g. dextran). There is no evidence that plasma substitutes are superior to normal saline in the resuscitation of a woman in shock, and dextran can be harmful in large doses. Ringer's lactate or Hartmann's are the preferred initial IV fluids for resuscitation
- If a **peripheral vein cannot be cannulated**, perform a venous cut down

INFECTION PREVENTION AND CONTROL

- Consider every person (woman or staff) as potentially infectious.
- Hand washing is the most practical procedure for preventing cross-contamination.
- Wear gloves before touching anything wet—broken skin, mucousmembranes, blood or other body fluids (secretions or excretions).
- Use barriers (e.g. protective goggles, face masks or aprons) if splashes and spills of any body fluids (secretions or excretions)are anticipated.
- Use safe work practices such as not recapping or bending needles, proper instrument processing, and proper disposal of medical waste (ref 8)

MEDICATIONS USED IN PPH

Note: All of these drugs (given below) are available in Pakistan except **Carbetocin & Carboprost** (has excessive side effects)**. Ergometrine** is registered but not available at present, caution with Hypertension)

FIRST ACTION IS Uterine Massage
Maintain IVL with NS or RL
Give Medication

Drug	Dose & Route	Continuing Dose	Maximum Dose	Precautions & Contraindications
Oxytocin	IM 10 U IV 20 U in 1000 ml NS at fastest flow possible	IV 20 u in 1000ml at 40 drps /min	NOT more than 3 litres of IV fluids containing Oxytocin	DO NOT Give IV Bolus
Ergometrine	IM OR IV Slowly 0.2mg	Repeat 0.2mg after 15 mins if required	5 doses (Total 1.0 mg)	High BP, Pre-eclampsia Heart Disease, Retained Placenta

DRUG	DOSE & ROUTE	CONT. DOSE	MAX DOSE	CAUTIONS & CI
Carbatocin (heat stable	100 mcg IM or IV over 1 min	-	140 mcg	Asthma Cardiac disease
Carboprost	0.25 mg IM, every 15–90 min, 8 doses maximum (can be used as intramyometrial)		2 mg	Asthma Heart Dis*

Do Not give Prostaglandins IV

DRUG	DOSE & ROUTE	CONT. DOSE	MAX DOSE	CAUTIONS & CI
MISOPROSTOL (Pg E1)	Sublingual 800 mcg	Repeat 200 – 800 mcg	Max 1600 mcg	
Prostaglandin F2a	IM 0.25mg	0.25mg Every 15 mins	Total 8 Doses (2 mg)	Asthma

DRUG	DOSE & ROUTE	CONT. DOSE	MAX DOSE	CAUTIONS & CI
Tranexamic Acid	1g I/V slow over 10mins	Repeat after 30 mins if bleeding continues	Not more than 10mg/kg body wt 3 to 4 times daily	No benefit after 3 hrs (may harm) H/O of Coagulopathy, IV clotting, convulsions

CLINICAL USE OF BLOOD, BLOOD PRODUCTS, AND REPLACEMENT FLUIDS

It is important to be aware of the principles designed to assist health workers in deciding when (and when not) to transfuse Blood.

The appropriate use of blood products is defined as the transfusion of safe blood products to treat a condition leading to significant morbidity or mortality that cannot be prevented or managed effectively by other means.

Conditions that might require blood transfusion include:

- postpartum haemorrhage leading to shock
- loss of a large volume of blood at operative birth
- severe anaemia, especially in later pregnancy or if accompanied by cardiac failure.

PRESCRIBING BLOOD

Prescribing decisions should be based on national guidelines on the clinical use of blood, taking the woman's needs into account. Women with positive blood group (A,B,AB +) can be transfused uncross matched O +ve and Negative group (A,B,AB-) can be transfused O negative blood group in case of life threatening conditions, instead of waiting for 2 hours for getting cross matched blood to arrive.

- Before prescribing blood or blood products for a woman, keep in mindthe following:
  - expected improvement in the woman's clinical condition;
  - methods to minimize blood loss to reduce the woman's need for transfusion
  - alternative treatments that could be given, including IV replacement fluids or oxygen, before making the decision totransfuse;
  - specific clinical or laboratory indications for transfusion;
  - risks of transmitting HIV, hepatitis, syphilis or other infectiousagents through the blood products that are available;
  - benefits of transfusion versus risk for the particular woman;
  - other treatment options if blood is not available in time;
  - the need for a trained person to monitor the woman andimmediately respond if a transfusion reaction occurs.

MONITORING THE TRANSFUSED WOMAN

For each unit of blood transfused, monitor the woman at the followingstages:

- before starting the transfusion;
- at the onset of the transfusion;
- 15 minutes after starting the transfusion
- at least every hour during the transfusion;

INTRAVENOUS REPLACEMENT THERAPY

IV replacement fluids are the first-line treatment for hypovolaemia. Initial treatment with these fluids may be life-saving and can provide some time to control bleeding and obtain blood for transfusion if it becomes necessary. Hypotension should be corrected in ALL especially in Anaemic women, as it may kill them.

CRYSTALLOID FLUIDS

Crystalloids contain a similar concentration of sodium as in plasma; cannot enter cells because the cell membrane is impermeable to sodium; and pass from the vascular compartment to the extracellular space (normally only a quarter of the volume of crystalloids infused, remains in the vascular compartment).

To restore circulating blood volume (intravascular volume), infuse crystalloids in a volume at least 3 times the volume lost.

COLLOID SOLUTIONS

There is a very limited role for colloids in resuscitation, & they are more expensive than crystalloids

- Colloid particles that are larger than crystalloids and tend to remain in the blood where they mimic plasma proteins to maintain or raise the colloid osmotic pressure of blood.
- Colloids are usually given in a volume equal to the blood volume lost. In many conditions where the capillary permeability is increased (e.g. trauma,

sepsis), leakage out of the circulation will occur andadditional infusions will be necessary to maintain blood volume.

- There is no evidence that colloid solutions (albumin, dextrans, gelatins, hydroxyethyl starch solutions) have advantages over normal saline or balanced salt solutions for resuscitation.
- There is evidence that colloid solutions may have an adverse effect on survival.
- Human plasma should not be used as a replacement fluid. All forms of plasma carry a risk, similar to that of whole blood, of transmitting infection, such as HIV and hepatitis.
- Plain water should never be infused intravenously. It will cause haemolysis & probably be fatal.

MAINTENANCE FLUID THERAPY

Maintenance fluids are crystalloid solutions, such as dextrose or dextrose in normal saline, used to replace normal physiological losses through skin,lungs, faeces and urine. If it is anticipated that the woman will receive IV fluids for 48 hours or more, infuse a balanced electrolyte solution (e.g. potassium chloride 1.5 g in 1 L IV fluids) with dextrose. The volume of maintenance fluids required by a woman will vary, particularly if the woman has fever or if the ambient temperature or humidity is high, in which case losses will increase.

PROPHYLACTIC ANTIBIOTICS

Performing certain obstetrical procedures (e.g. caesarean birth, manualremoval of placenta) increases a woman's risk of infectious morbidity.This risk can be reduced by:

- following recommended infection prevention and control practices and
- providing prophylactic antibiotics at the time of the procedure.

Whenever possible, give prophylactic intravenous antibiotics 15–60 minutes before the start of a procedure to achieve adequate blood levels of the antibiotic at the time of the procedure. One dose of prophylactic antibiotics (Co-Amoxyclav 1.2 g or Amoxycillin 500mg + metronidazole 500 mg IV or Cefuroxime 750 mg IV or Cephradine 500 mg IV) is sufficient and is no less effective than three doses or 24 hours of antibiotics for preventing infection after an obstetrical procedure. If the **procedure lasts longer than six hours** or **blood loss is 1500 mL or more**,give a second dose of prophylactic antibiotics to maintain adequate blood levels during the procedure.

Obstetrical procedures for which antibiotic prophylaxis is recommended for the woman include the following:

- elective and emergency caesarean (**note:** prophylaxis to be givenbefore starting the skin incision whenever possible)
- suturing of third and fourth degree genital tears
- manual removal of the placenta
- placement of uterine balloon tamponade (ref 10)

SYMPTOMS AND SIGNS of SHOCK

Diagnose shock if the following symptoms and signs are present:

- fast, weak pulse (>110 beats per min);
- low BP (systolic BP < 90 mmHg).
- pallor (especially of inner eyelid, palms or around mouth);
- sweating or cold, clammy skin
- rapid breathing (> 30 breaths per minute)
- anxiousness, confusion or unconsciousness ("ghabrahat")
- scanty urine output (<30 mL per hour).

Early recognition of Shock (reduced tissue perfusion) in PPH
Changes in vital signs appear late (>1000 mls bld loss)

Shock Index (SI)

- Heart Rate: Systolic BP
- 0.7 – 0.9 (standard Obstetric)
- 0.5 - 0.7 (non pregnant)
- >0.9 =haemodynamic instability
  - Increased mortality
- >1 = Blood Tx increased risk

Rule of 30

- Loss of 30% blood vol
  - 70mls/kg adults
  - 100 mls/kg pregnant women
- 30% fall in Hematocrit
- 30% fall in Hb (3 g/dl)
- 30 mmHg fall in Systolic BP
- 30 beats/min rise in pulse

FIGO recommends use of Shock Index in Diagnosis & Management of PPH

SPECIFIC MANAGEMENT

- Start an IV infusion (two if possible) using a large-bore (14 or 16-gauge or largest available) cannula / needle.
- **Do not give fluids by mouth to a woman in shock**
- Collect blood for estimation of haemoglobin, immediate cross-match and bedside clotting test, just before infusion of fluids
- Rapidly infuse IV fluids (normal saline or Ringer's lactate)initially at the rate of 1 L in 15–20 minutes.
- Give at least 2 L of these fluids in the first hour. This is over and above fluid replacement for ongoing losses.

  Note: A more rapid rate of infusion is required in the managementof shock resulting from bleeding. Aim to replace two to three times the estimated fluid loss.
- Continue to monitor vital signs (every 15 minutes) and blood loss.
- Catheterize the bladder and monitor fluid intake and urine output
- Give oxygen at 6–8 L per minute by mask or nasal cannulae
- If available, apply a **non-pneumatic anti-shock garment (NASG)** as a temporizingmeasure until appropriate care is available and /or UBT

Blood Transfusion

- There are no firm criteria for initiating blood transfusion. The decision should be based on both clinical and haematological assessment.
- Fresh whole blood is rarely available in blood banks & Cross matching takes over 1 hour
- Group specific blood can be used
- **Major obstetric haemorrhage protocols must include the provision of emergency blood with immediate issue of group O-negative and K-negative units, with a switch to group-specific blood as soon as feasible**
- <0.1% risk of tranfusion reaction if no abnormal antibodies detected antenatally
- 1% risk of reaction if Group Specific blood used without screening
- O-neg only when group specific blood not available (possible sensitization to "C" antigen)
- **All delivery units, especially small units without a blood bank on site, should maintain a supply of group O, RhD-negative blood**
- **Cryoprecipitate** has more fibrinogen than FFP but lacks Antithrombin III (coagulation inhibitor). Used in profound hypofibrinogenemia
- Platelet packs (shelf life 5 days) are rarely needed (if count < 50x10/L)
- Factor VII A (not recommended)
- Consider CVP line

BEDSIDE CLOTTING TEST

Assess clotting status using this **bedside clotting test (**if coagulopathy is suspected):

- Take 2 mL of venous blood into a small, dry, clean, plain glass test tube (approximately 10 mm x 75 mm).
- Hold the tube in a closed fist to keep it warm (± 37°).
- After four minutes, tip the tube slowly to see if a clot is forming. Then tip it again every minute until the blood clots and the tube can be turned upside down.
- Failure of a clot to form after **7 minutes** or a soft clot that breaks
- down easily suggests coagulopathy

If the **woman's condition improves**:

- Adjust the rate of infusion of IV fluids to 1 L in six hours.
- Continue management for the underlying cause of shock

If the **woman's condition fails to improve or stabilize**:

- Continue to infuse IV fluids, adjusting the rate of infusion to 1 L in 6 hours, and maintain oxygen at 6–8 L per minute.
- Closely monitor the woman's condition.
- Perform laboratory tests, including repeat haemoglobin determination,blood grouping and Rh typing, serum electrolytes & creatinine and blood pH

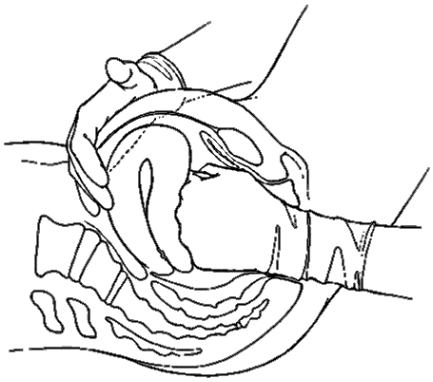
Facility Emergency Preparedness: Keep emergency treatment packs/ boxes ready in emergency trolley or cupboard

Emergency Pack for PPH Contents:

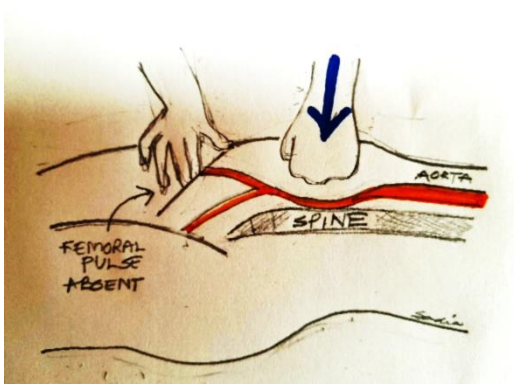
- IV Fluids 2L (N/S OR RL)
- IV Cannula 14 G or 16 G (X2)
- Blood giving set/ IV giving set
- Specimen tubes (Group/cross match)
- Foley's catheter
- Sterile Gloves
- Uterine Balloon Tamponade (UBT) kit
- DRUGS
- OXYTOCIN 20 U (x2 doses)
- ERGOT 0.2mg (x 2 doses)
- MISOPROSTOL 1000 mcg (4 tabs)
- Tranexamic Acid (1g) x 2 doses

EMERGENCY PROCEDURES

Bimanual uterine compression or **external aortic compression** for the treatment of PPH due to uterine atony after vaginal birth is recommended as a temporizing measure until appropriate care is available



Bimanual uterine compression



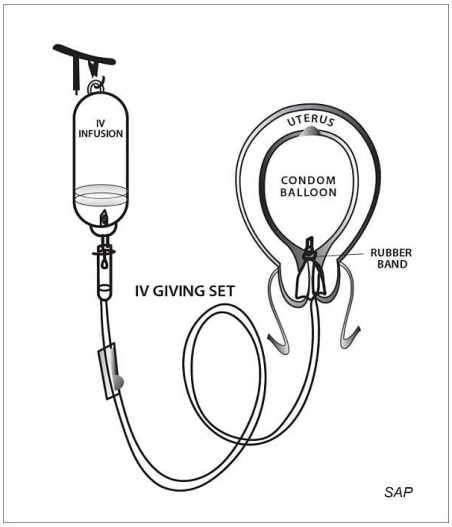
Aortic compression

UBT (Uterine Balloon Tamponade)

If women do not respond to uterotonics, or if uterotonics are unavailable, the use of **uterine balloon tamponade (UBT)** is recommended as an effective nonsurgical technique that can potentially improve survival in women with PPH due to uterine atony after ruling out retained products of conception or uterine rupture as a contributing factor. **Uterine balloon tamponade (UBT)** is an effective nonsurgical technique that when employed rapidly by a properly trained person with a

proven device in the context of quality PPH care (the PPH bundle) improves survival of women with refractory PPH. Examples of various UBTs are given below from commercially available (Ellavi) and those easily assembled with Condoms/gloves, rubber bands/suture tie, IV giving set/Foley's catheter. (WHO MCPC 2017)

Simplified UBT for Pakistan



Ellavi UBT Kit

Assembling the UBT: (wear sterile gloves to assemble on a sterile tray/ sheet/ paper)

- Assistant removes the IV giving set, condom out of the packaging & deposits on a sterile surface.
- Roll out the condom completely
- Remove the needle & it's cap from the IV giving set (not required)
- Assistant will attach the 500ml Mineral water bottle or normal saline IV infusion with the other end of the IV giving set, run the water/ saline in the tubing till end then close the valve on the IV giving set
- Insert the end of giving set from where the needle has been removed into the condom
- Secure the condom on the rigid portion of the IV giving set (Avoid the soft flexible tubing of the IV giving set)
- Twist one rubber band 4 times (or place a sterile suture tied with surgeon's knot) around the condom on the rigid hub of IV giving set

Placement of UBT:

- Catheterize & retain Foley's catheter for emptying bladder & monitoring urine output (if not already in place)
- Press the uterine fundus downwards slightly to align it with the cervix & vagina, to make the insertion easier
- After all aseptic measures insert a Sim's speculum and retract the posterior vaginal wall
- Use iodine disinfectant cotton swab, or povidone iodine solution to gently wipe the entire surface of the condom & rubber band
- Visualize the cervix and hold the anterior lip of the cervix with a sponge forceps
- Hold the condom of the assembled UBT with another Sponge forceps or between index & middle finger & insert the condom into the middle of the uterine cavity
- Hold up the Normal saline infusion bag or Mineral water bottle and open the valve of the IV giving set on full flow
- Fill the condom with 300- 500ml of mineral water or normal saline until the **inflated balloon becomes visible in the cervical canal,** & bleeding stops **(when balloon pressure exceeds patient's BP)**

- Once the bleeding stops close the valve of the IV giving set, so no more fluid enters the condom
- Fix the tubing of the IV giving set to the patient's thigh with an adhesive tape
- Uterine fundus is palpated & a mark is made on the abdomen to monitor for any further uterine distention indicating ongoing bleeding
- Keep uterus contracted with IV infusion of 40 units oxytocin in 500 mls of normal saline given over 8 hours
- *If considerable resistance is felt while inflating the balloon and bleeding persists, pause fluid instillation and re-examine balloon placement to ensure that it is correctly placed inside the uterus and that there are no other sources of bleeding.*

Monitoring

- Once bleeding stops, the patient is ready for careful observation or transfer to a referral facility. The UBT device should stay in place for at least 6-24 hours and should always be kept in place during transfer.
- Monitor the patient continuously for signs of increased vaginal bleeding, pulse, Blood Pressure, fundal height, temperature and urine output
- A prophylactic dose of antibiotic (e.g Amoxycillin-clauvulenic acid, Metronidazole) is recommended.
- Give appropriate IV fluids or blood replacement products until she is stable & not bleeding heavily
- Worsening clinical signs & symptoms should lead to more aggressive treatment and management

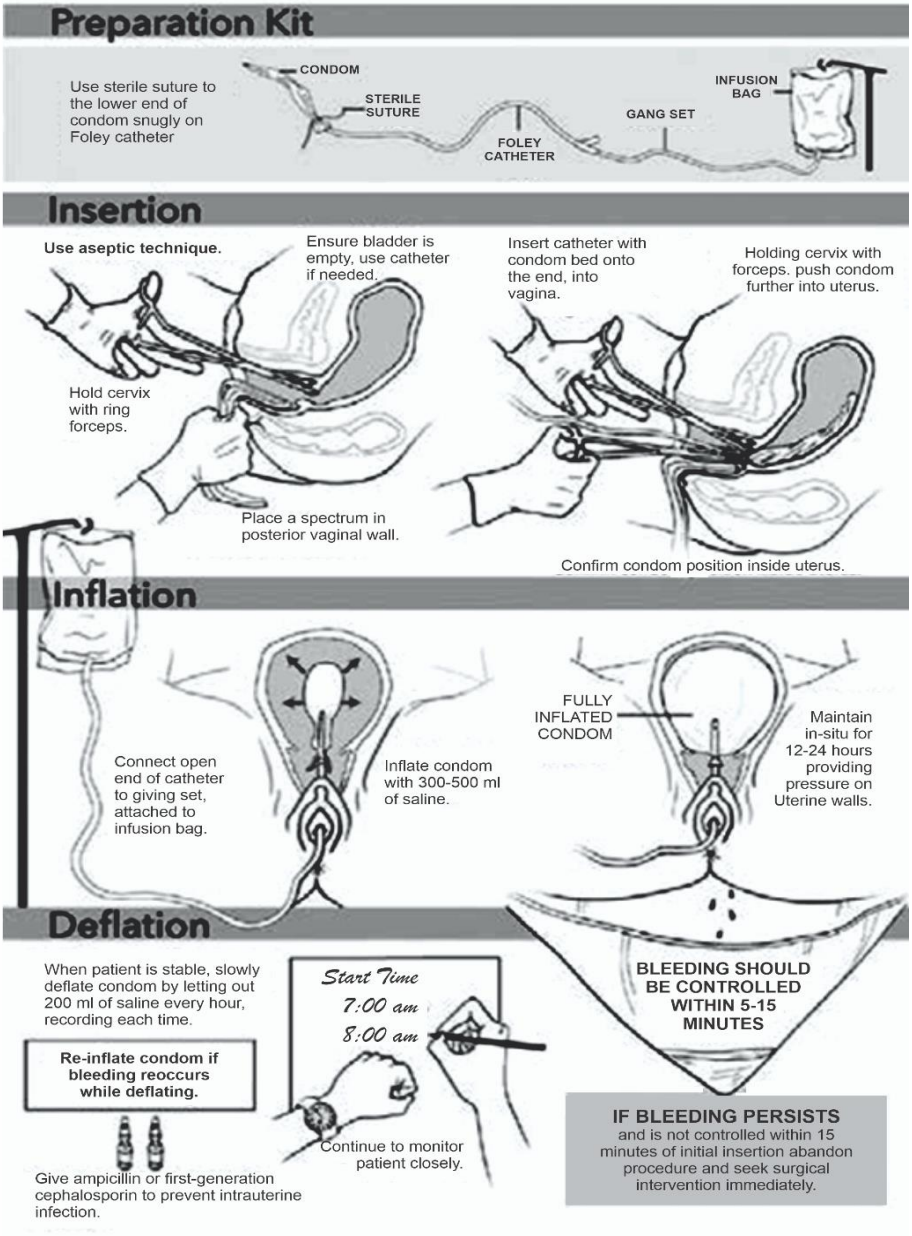
UBT Removal

The timing of balloon removal should be decided by senior clinicians once the patient is stabilized.

- Keep the patient fasting, when removal is planned, in case the patient starts to bleed and anaesthesia is required
- Put the IV infusion bottle on a lower level than the patient & open the valve of the IV giving set & remove 50-100 ml of fluid from the condom balloon, then close it again
- Observe for 30 –60 minutes for return of bleeding. Re-inflate if bleeding resumes. If bleeding remains arrested, fully deflate the condom by removing all the fluid from it
- Remove the adhesive tape on thigh & UBT device from the patient's uterus and vagina by pulling it out
- Continue 20 units oxytocin infusion for another 12-24 hrs to keep uterus well contracted

Warnings:

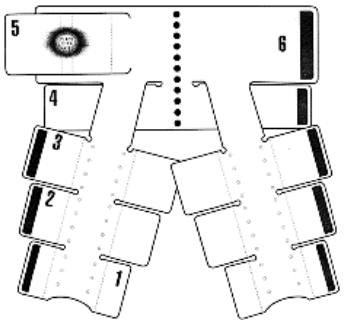
- UBT is a single use disposable device
- Avoid excessive force when inserting the balloon into the uterus
- Use of this device should not delay appropriate application of other critical interventions such as uterotonics, blood products, angiography and/or surgery.
- Avoid leaving the UBT indwelling for more than 24 hours (Senior clinicians to decide)
- The balloon should never be inflated with air, carbon dioxide, or any other gas.
- Use 500 mls maximum inflation of the condom balloon



(UBT Preparation kit : Source WHO MCPC 2017 (ref 10))

Uterine Vacuum Tamponade (UVT) is an alternative to UBT showing efficacy in reported trials. Suction tamponade has been shown to be beneficial in prospective studies and are being studied in larger trials. (Ref 8). It is an intrauterine balloon catheter (like Foley's) filled with 70 mL of solution, to apply intrauterine vacuum. Vacuum-induced tamponade helps to suck blood from the uterine cavity and supports uterine contraction, leading to a coiling of the spiral arteries and reduced blood loss (Ref 9))

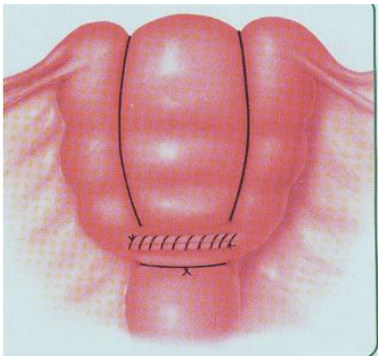
Non-pneumatic antishock garment (NASG) use is recommended as a temporizing measure until appropriate care is available. The **nonpneumatic antishock garment (NASG)** is an effective nonsurgical device that should be in every healthcare facility. The NASG, when used as a temporizing measure to recover hemodynamic stability in the context of PPH, decreases morbidity, mortality, and hypovolemic shock, and is of special importance in a LMIC (Low middle income countries) like Pakistan



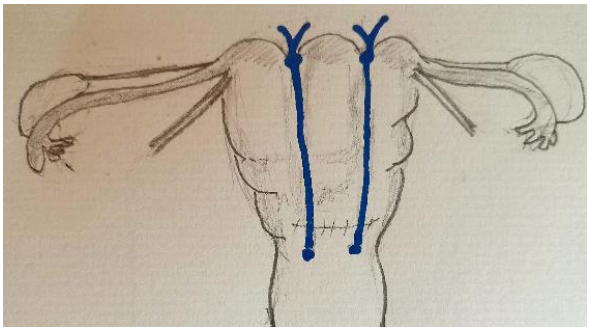
Uterine packing is not recommended for the treatment of PPH due to uterine atony after vaginal birth

Uterine artery embolization can be another conservative management for PPH if technical conditions and skilled human resources are available for its use. **Interventional radiology** may be indicated for the prevention and treatment of PPH either before delivery, in cases of known placental abnormalities and implantation (Placenta Accreta/ percreta), or after delivery when the patient is hemorrhaging. **Prophylactic catheterization of the uterine arteries**, with **embolization**, can be considered an important therapeutic strategy that is safe and effective for reducing maternal and fetal morbidity and mortality by controlling blood loss.

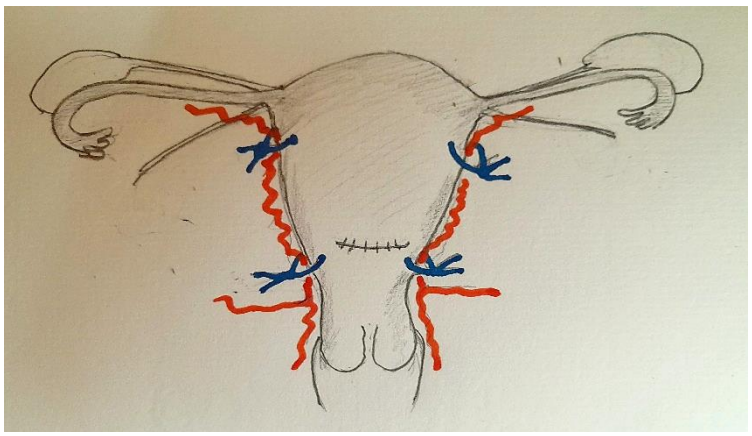
Surgical interventions are recommended if bleeding does not stop despite using uterotonics and other available conservative interventions (e.g. uterine massage, balloon tamponade). Surgical interventions include **compression suture** techniques, **uterine & hypogastric artery ligation**, & **hysterectomy**.



B-Lynch Suture



Simplified Brace Suture



Bilateral Uterine & Ovarian Artery Ligation

Stop bleeding before the patient develops coagulation problems and organ damage from under-perfusion. Conservative approaches should be tried first, rapidly moving to more invasive procedures if these do not work. For additional details of surgical procedures refer to WHO MCPC Manual (ref. 10)

Obstetricians must quickly recognize the onset of PPH, safely administer uterotonics, and place emergent **compression sutures** if needed. In the immediate postoperative period, women should be monitored for complications such as hematometra, pyometra, and uterine synechiae. Most important is the ability of the obstetrician to control bleeding using medical and surgical interventions, stabilize the mother, and reduce maternal morbidity.

W**hen medical treatment fails** to control the bleeding, several surgical options exist. To date, no randomized controlled trials have assessed these techniques, nor compared the superiority of one to another, and all the data are based on case reports and case series. The use of these methods largely depends on the healthcare facilities and on the care providers' clinical skills.

Better and regular training of all care providers in these life-saving techniques, should be conducted. Future fertility following these procedures remains under-assessed due to the lack of long-term follow-up. More research should target these surgical techniques to avoid the more morbid procedures, to improve maternal and perinatal outcomes.

Detailed description of these surgical procedures can be found in the WHO MCPC Manual (2017) updated version in print (Ref 10)

Damage control resuscitation (DCR) & **Damage Control Surgery (DCS)** for refractory severe PPH, is a combination of resuscitation and surgical interventions with the purpose of restoring hemostasis and normal physiology. These techniques have proven to be applicable in obstetrics, with satisfactory results controlling refractory PPH with an overall decreased mortality of critically ill patients, especially in patients in whom conventional treatment can be linked to a high risk of failure. DCS is an available therapeutic approach for the management of severe PPH, thus proper training must be widespread to implement this technique. (Figo 2022)

Basic recommendations for resuscitation in PPH: (Figo 2022)

- Administration of crystalloids in small boluses of 500 ml, checking clinical signs & looking for improvement. Balanced crystalloid solutions such as Ringer's lactate is preferred over chlorine-rich solutions.
- The target blood pressure in **hypotensive resuscitation** is **80–90 mm Hg for systolic blood pressure** or 50–60 mm Hg for mean blood pressure.
- In **hemostatic reanimation**, fewer crystalloids are administered and, instead, blood replacement is started earlier with high ratios of transfusion of **Packed cells: FFP: Platelets (1:1:1)** OR give **Whole Blood** transfusion
- During **massive transfusions**, the target for **serum fibrinogen** is 150–200 mg/dl and the usual dose of **cryoprecipitate** is 10 units; it is estimated that these will raise the serum **fibrinogen** by 100 mg/dl.
- **Massive transfusion Protocol (MTP)** should be in place at each institution. For every 4 units of packed red blood cells 15 ml/kg Fresh Frozen Plasma (FFP) is given. Physicians should be familiar with their hospitals' protocol and recommendations.
- Develop a MTP for your institution. It should be initiated when there is loss of 50% of blood volume, or 4 units of packed cells have been transfused, or there is haemodynamic instability with profuse bleeding.

Massive Transfusion Protocol (MTP) Checklist :

- Create your own MTP. Establish a working group with nearest blood bank, and other stakeholders
- Establish rapid communication between Obs ward & Blood banks
- Essential lab testing & rapid reporting
- Have O-ve blood always available and group specific blood, know what is available
- Rapid transport of blood and products
- Ensure Emergency trolley with PPH kits, supplies for lab work & blood administration is available in every labour ward
- Regular training & re-training of Providers (e.g x 6 monthly)
- Clear communication with the patient's family about giving blood (& its products)

Table 1: Transfusion products, components, dosage, and desired effect.

	Components	Effect	Dosage	Objective
Packed red blood cells	Red cells, white cells, and Plasma	Raises hemoglobin by 1g/dl and hematocrit by 3%	Clinical evaluation	Hemoglobin above 8g/dl
Fresh frozen plasma (FFP)	Fibrinogen, antithrombin III, factors and VIII	Increases fibrinogen by 10mg/dL	10-20ml/kg	INR ≤ 1.5
Cryoprecipitate	Fibrinogen, factors VIII and XIII, von Willebrand factor	Increases fibrinogen by 10mg/dL	1IU/10kg	Fibrinogen ≥150mg/dl
VIII and XIII, von Willebrand factor	Platelets, red cells, white cells, plasma	Increases platelets by 5000-10000/mm3	1IU/10kg	Platelets ≥ 50000/ mm3
Whole blood	Red cells, FFP, platelets and coagulation factors	Refill blood	Clinical evaluation	Patient stabilization

Source: MGH MTP (Ref 9)

IMPLEMENTATION OF THE RECOMMENDATIONS BY HEALTH SYSTEMS AND NATIONAL SOCIETIES FOR THE MANAGEMENT OF PPH IN PAKISTAN

- All national societies must lobby and work with the Government to reduce maternal mortality and morbidity due to PPH in Pakistan, and work with their respective regional and national organizations to promote and implement these recommendations.
- Aim to establish a PPH bundle approach and make the medical supplies and surgical equipment needed for the management of PPH readily available, added to the essential medicines/ equipment list, in all regions of Pakistan.
- **Audit newsletters**: Sharing with all staff monthly rates of detection and bundle use, along with rates of PPH, severe PPH, blood transfusion, laparotomy, and death from PPH and giving feedback at monthly departmental meetings
- **Champions:** Midwife and doctor to oversee change, troubleshoot, give feedback on audit newsletters, connect with other champions by means of chats, meetings, and websites for sharing knowledge and lessons learned

- **Trolley or carry case:** Restocking of all medicines and devices used for treatment of PPH after every use and completion of a stocking checklist at the start of every shift Training: **Barriers and gaps** can be addressed through providing an enabling environment through supportive policies, designing a formal plan for supplies, task shifting strategies, and use of guidelines and protocols for successful implementation.

- **Regular Onsite Simulation based training**, peer assisted, facilitated with provider guides, flipcharts, and job aids displayed in labor wards
- and each hospital should have a **Protocol** on the management of PPH & Massive Blood Transfusion, Referral Network Integration, record keeping & audit
- **NCMNH, AMAN, MAP & other OBGYN oranizations like SOGP, in Pakistan working on maternal and Child Health**, should lobby to have the essential medications and equipment that are needed to prevent and treat PPH, readily available in all maternity centers.
- **Research** is still necessary to improve knowledge on implementation issues for NASG use in refractory PPH management.
- All health systems are obligated to provide **respectful care** to the woman, the infant, and the associated family. Health systems must provide the appropriate and effective medications, water, oxygen, equipment, training, and transfer mechanisms to save the lives of women and newborns.
- **Postpartum contraception** (PPIUCD, Implants), & FP Counselling should be part of routine care
- **PPH Bundle approach** management workshops for all involved in care of pregnant women with govt support. This is currently being done by Senior Obstetricians & Gynaecologists (masterTrainers) on a voluntary basis.
- Training of all HCPs in quality Antenatal care with 8 contact visits; de worming & Antenatal **correction of Anaemia** with oral and Parenteral iron. This should also be done before discharge home post partum
- **Medical Supplies** should include heat stable Carbetocin, NASG, UBT, Under the buttock Drapes for blood collection, and added to the essential medical supplies list.
- **Uniform Record keeping**: Obstetric register with additional variables columns including mode of delivery, AMTSL, EBL PPFP (PPIUCD/ Implant/ depo progesterone) Newborn information, Post-partum monitoring. As recently developed by WHO
- Regular central reporting of data to the Provincial and National Health departments
- Implement standard forms for referral to secondary and tertiary care centers
- PPH Bundle approach training & certification should be mandatory in undergraduate and postgraduate training curriculum
- **The MOH** should facilitate local manufacturing of :
  - Carbetocin (heat stable utero tonic with efficacy comparable to Oxytocin)
  - Cost effective **UBT kits** like Ellavi
  - NASG Anti shock garment
  - Under buttock plastic blood collection drape (preferably biodegradable plastic) for measuring blood loss

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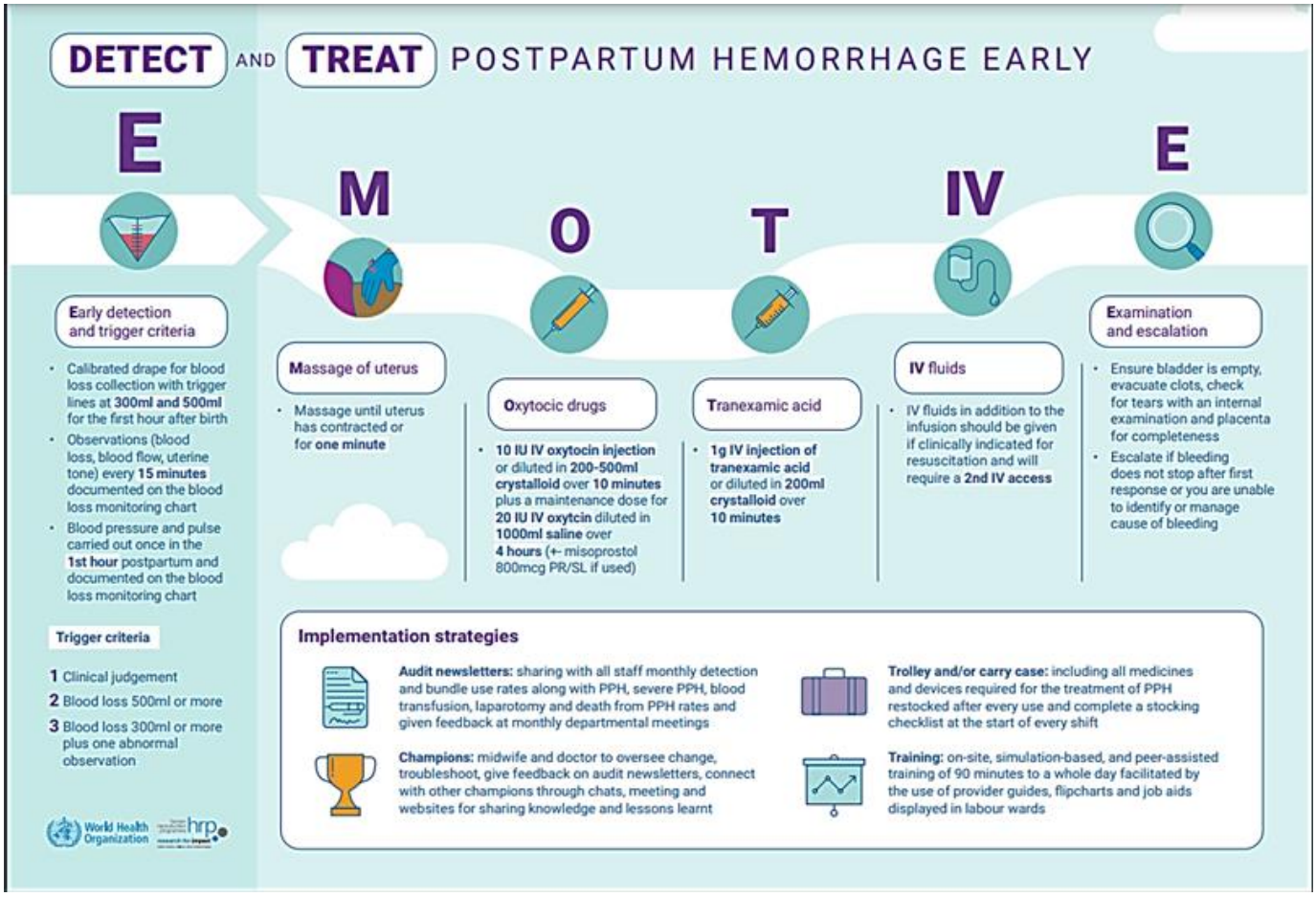
Appendix


DETECT AND TREAT POSTPARTUM HEMORRHAGE EARLY
E
Early detection and trigger criteria
Calibrated drape for blood loss collection with trigger lines at 300ml and 500ml for the first hour after birth
Observations (blood loss, blood flow, uterine tone) every 15 minutes documented on the blood loss monitoring chart
Blood pressure and pulse carried out once in the 1st hour postpartum and documented on the blood loss monitoring chart
Trigger criteria
1 Clinical judgement
2 Blood loss 500ml or more
3 Blood loss 300ml or more plus one abnormal observation
World Health Organization
M
Massage of uterus
Massage until uterus has contracted or for one minute
O
Oxytocic drugs
10 IU IV oxytocin injection or diluted in 200-500ml crystalloid over 10 minutes plus a maintenance dose for 20 IU IV oxytcin diluted in 1000ml saline over 4 hours (+- misoprostol 800mcg PR/SL if used)
T
Tranexamic acid
1g IV injection of tranexamic acid or diluted in 200ml crystalloid over 10 minutes
IV
IV fluids
IV fluids in addition to the infusion should be given if clinically indicated for resuscitation and will require a 2nd IV access
E
Examination and escalation
Ensure bladder is empty, evacuate clots, check for tears with an internal examination and placenta for completeness
Escalate if bleeding does not stop after first response or you are unable to identify or manage cause of bleeding
Implementation strategies
Audit newsletters: sharing with all staff monthly detection and bundle use rates along with PPH, severe PPH, blood transfusion, laparotomy and death from PPH rates and given feedback at monthly departmental meetings
Champions: midwife and doctor to oversee change, troubleshoot, give feedback on audit newsletters, connect with other champions through chats, meeting and websites for sharing knowledge and lessons learnt
Trolley and/or carry case: including all medicines and devices required for the treatment of PPH restocked after every use and complete a stocking checklist at the start of every shift
Training: on-site, simulation-based, and peer-assisted training of 90 minutes to a whole day facilitated by the use of provider guides, flipcharts and job aids displayed in labour wards

PPH Emergency Response

AMTSL

CALL FOR HELP!

First Response Bundle

Uterine Massage

IV Fluids

Uterotonics

Tranexamic Acid

SUPPORTIVE MEASURES

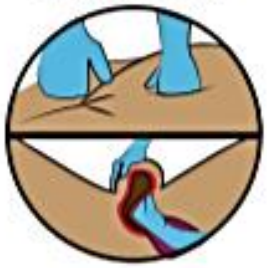
Treat tears

Empty bladder

Empty uterus

Refractory PPH Interventions

Compression



Uterine Balloon

Anti-shock Garment

SUPPORTIVE MEASURES

Transfusion

Referral

Surgery

11/19/2019

PPH Prevention

- Anemia prevention and early detection
- Malaria prevention, detection, and control
- HIV status and treatment if necessary
- Identification of previous and current co-morbidities
- Birth planning and complication preparedness

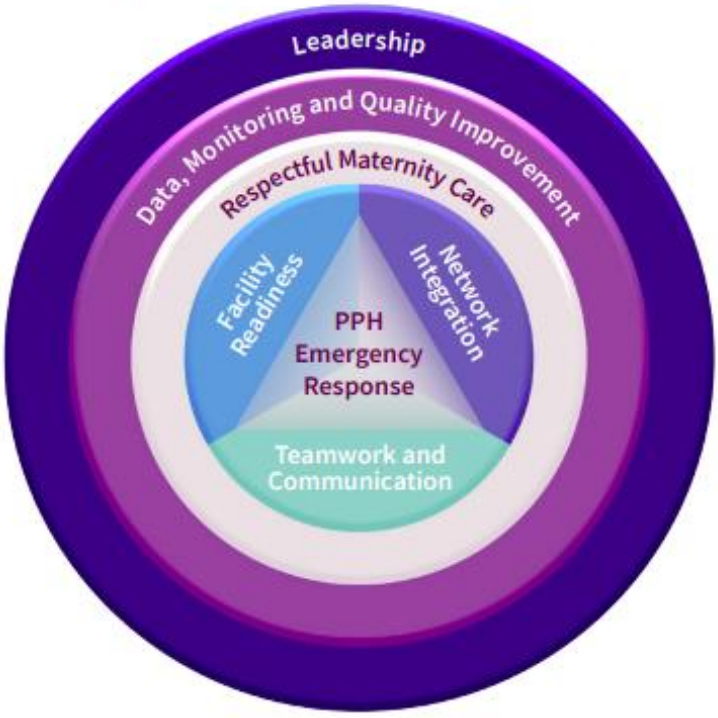
First Response

- Early recognition of excessive bleeding
- Monitor vital signs (pulse, BP, temperature, and respirations), volume and rate of blood flow, level of consciousness or anxiety, skin color, and response to treatments
- Laboratory Testing for Hgb/HCT, clotting factors (or bedside clotting test), and Type and Cross match
- If Placenta delivered, was it intact, or is it retained?
- Reassurance to woman and her family that everything is being done

Response to Refractory PPH

- Inform woman and her family of treatment options, provide reassurance
- Continue monitoring for status and development of shock, if shock suspected begin shock management
- Surgical Management
  - Uterine compression sutures
  - Uterine or utero-ovarian artery ligation
    - Begin with conservative management, try to spare the uterus
  - If woman continues to bleed, perform hysterectomy

Quality PPH Emergency Care



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Best Practices in PPH Prevention & Management