Sultanate of Oman
Ministry of Health
The Royal Hospital
Department of Obstetrics and Gynecology

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Title: POST PARTUM HEMORRHAGE

1.0 Introduction

Post partum hemorrhage (PPH) is the leading cause of maternal death worldwide. PPH occurs in 5% of all deliveries and is responsible for a major part of maternal mortality. The majority of these deaths occur within 4 hours of delivery, which indicates that they are a consequence of the third stage of labor.

Non fatal PPH results in further interventions, iron deficiency anemia, pituitary infarction(Sheehan's syndrome) with associated poor lactation, and exposure to blood products, coagulopathy, and organ damage with associated hypotension and shock.

Since all parturient women are at risk for PPH, care providers need to possess the knowledge and skills to practice active management of the third stage of labor to prevent PPH and to recognize, assess, and treat excessive blood loss.

2.0 Definition: -

Primary PPH is defined as excessive bleeding that occurs in the first 24 hours after delivery.

- More than 500 in vaginal delivery
- More than1000mls in caesarian section

Secondary PPH is defined as abnormal or excessive bleeding from the birth canal between 24 hours and 12 weeks postnatally.

PPH is divided in to Minor and major PPH

- Minor PPH is 500–1000 ml.
- Major PPH is more than 1000 ml.

Major can be further subdivided into -

- Moderate PPH 1001–2000 ml
- Severe PPH more than 2000 ml.

In women with lower body mass (e.g. less than 60 kg), a lower level of blood loss may be clinically significant
ACOG (2017) , FIGO (2012), SOGC (2018) Has included any blood loss that has the potential to produce haemodynamic instability as post partum haemorrhage

3.0 Etiology of PPH - 4 Ts:

•Tone: uterine atony, distended bladder

•Tissue: retained placenta and clots

•Trauma: vaginal, cervical, or uterine injury

• Thrombin:coagulopathy (pre-existing or acquired)

The most common and important cause of PPH is uterine atony. The primary protective mechanism for immediate hemostasis after delivery is myometrial contraction causing occlusion of uterine blood vessels, the so-called living ligatures of the uterus.

4.0Risk factors for postpartum hemorrhage (PPH)

- Risk factors for PPH may present antenatally or intrapartum; care plans must be modified as and when risk factors arise.
- Antenatal anaemia should be investigated and treated appropriately as this may reduce the morbidity associated with PPH.

Etiologic category	**Etiologic process**	**Clinical risk factors**
Tone: abnormalities of uterine contraction	Over distension of uterus	· Poly hydramnios · Multiple gestation · Macrosomia
	Uterine muscle Exhaustion	· Rapid labor, previous uterine scar · Prolonged labor · Dehydration · High parity · Oxytocin use
	Functional/anatomic distortion of uterus	· Bladder distension, which may prevent uterine contraction · Fibroids · Placenta previa · Uterine anomalies
	Uterine-relaxing medications	Halogenated anesthetics Nitroglycerin

	Intra-amniotic infection	· Fever · Prolonged rupture of membranes
Tissue: retained products of conception	Abnormal placentation	· Retained cotyledon /succenturiate lobe · Incomplete placenta at delivery · Previous uterine surgery · High parity · Abnormal placenta seen on USG
	Retained blood clots	Atonic uterus
Trauma: of the genital tract	Lacerations of the cervix, vagina, or perineum	Precipitous delivery Operative delivery
	Extensions, lacerations at cesarean section	Malposition Deep engagement Uterine rupture
	Uterine inversion	High parity Fundal placenta Excessive cord traction
Thrombin: abnormalities of coagulation	Pre-existing states History of hereditary coagulopathies or liver disease	Hemophilia A Von Willebrand's disease History of previous PPH
	Acquired in pregnancy	· Idiopathic thrombocytopenic purpura · Thrombocytopenia with preeclampsia

		· Disseminated intravascular coagulation
	Gestational hypertensive disorder of pregnancy with adverse conditions	· Dead fetus in utero · Severe infection · Abruption (Antepartum hemorrhage) · Amniotic fluid embolus (Sudden collapse)
	Therapeutic anticoagulation History of thrombotic disease	

5.0 Prevention Of Postpartum Hemorrhage

- Active management of the third stage of labor (AMTSL) reduces the risk of PPH and should be offered and recommended to all women.
- Active management of 3rd stage - including the use of uterotonics, early clamping of the umbilical cord and controlled cord traction to expedite delivery of the placenta with the aim of reducing blood loss

5.1 Reducing blood loss at delivery - minimising risks -

- Uterine massage is of no benefit in the prophylaxis of PPH.
- Prophylactic uterotonics should be routinely offered in the management of the third stage of labour in all women as they reduce the risk of PPH.
- For women without risk factors for PPH delivering vaginally, oxytocin (10 iu by intramuscular injection) is the agent of choice for prophylaxis in the third stage of labour. A higher dose of oxytocin is unlikely to be beneficial.
- For women delivering by caesarean section, oxytocin (5 iu by slow intravenous injection) should be used to encourage contraction of the uterus and to decrease blood loss.
- Ergometrine–oxytocin may be used in the absence of hypertension in women at increased risk of haemorrhage as it reduces the risk of minor PPH (500–1000 ml).
- For women at increased risk of haemorrhage, it is possible that a combination of preventative measures might be superior to syntocinon alone to prevent PPH.
- Consider the use of intravenous tranexamic acid (0.5–1.0 g), in addition to oxytocin, at caesarean section to reduce blood loss in women at increased risk of PPH

6.0 MANAGEMENT

Early diagnosis of PPH should improve maternal out comes , but there is no evidence that this can be achieved through improving accuracy of blood loss volume measurements . The diagnosis may rely on speed of blood loss and nature of loss . Due to the haemodynamic adaptations of pregnancy , mother may tolerate significant amount of blood loss without signs of hypovolemia . Women with preexisting anaemia and low Body mass Index can become haemodynamically compromised early once PPH happens .

Clinical findings in Obstetric haemorrhage - Degree of shock parallels the amount of blood loss that results in these clinical markers

Blood volume loss	BP systolic	Symptoms and signs	Degree of shock
500- 1000 ml 10 - 15%	Normal	Palpitations , tachycardia, dizziness	compensated
1000 - 1500ml 15- 25 %	slight fall 80 - 100 mm of Hg	weakness, tachycardia , sweating	Mild
1500ml - 2000 ml 25- 35 %	Moderate fall 70 - 80 mm of Hg	Restlessness, pallor , oliguria	Moderate
2000 - 3000 ml 35 - 50 %	marked fall 50 - 70 mm of Hg	collpase , air hunger anuria	Severe

6.1 **Measures for minor PPH (blood loss 500–1000 ml) without clinical shock:**

- Intravenous access (one 14-gauge cannula)
- Urgent venepuncture (20 ml) for:

– group and screen

– full blood count

– coagulation screen, including fibrinogen

- pulse, respiratory rate and blood pressure recording every 15 minutes
- commence warmed crystalloid infusion.

All obstetric units should have a regularly checked PPH emergency equipment tray containing appropriate equipment.

6.2 Management of severe PPH - step wise approach

Volume of blood loss remains un reliable in many cases, therefore much attention should be directed to the general clinical status of the patient instead. Estimation of blood loss will directly influence the diagnosis and management of PPH. Visual estimate has a high potential to underestimate haemorrhage .Recently some guidelines have incorporated the shock index (SI)and obstetric early warning systems into their recommendations to evaluate bleeding.

Shock index (SI)is defines as the ratio of heart rate to systolic blood pressure . The SI aids early identification of women at risk of hypovolemia as the result of obstetric causes. It is proposed as a reliable indicator of adverse maternal outcomes. FIGO considers that SI can be a marker of severity of PPH and can alert teams to haemodynamic instability wnen its value is more than 0.9 .

The rule of 30 is an approximate blood loss of 30 % of normal (70 ml/ Kg in adults) defined by a fall of 30 % in haematocrit , 3 grams Hb drop , fall of 30 mm of Hg sytolic blood pressure, and a rise in PR by 30 bpm

If at any time Blood loss > 2000 ml , Systolic BP lessthan 80, Diastilic BP lessthan 40, and or Pulse more than 120 , initialte massive transfusion protocol and arrage OT

STEP I:- **Call for help - Involve Senior registrar and consultant early**

6.2 1 Resuscitation:

- o Large bore IV cannulation, size-16/14(green or above)
- o Oxygen by mask,
- o Monitor vitals and oxygen saturation,
- o Foley's catheter for output monitoring

6.2. 2 Fluid therapy and blood product transfusion

- Crystalloid Up to 2 l isotonic crystalloid.
- Colloid Up to 1.5 l colloid until blood arrives.
- Blood - If immediate transfusion is indicated, give emergency group O, rhesus D (RhD)-negative, K-negative red cell units. Switch to group-specific red cells as soon as feasible.
- Fresh frozen plasma (FFP) Administration of FFP should be guided by haemostatic testing and whether haemorrhage is continuing:
- If prothrombin time (PT) or activated partial thromboplastin time (APTT)are prolonged and haemorrhage is ongoing, administer 12–15 ml/kg of FFP.
- If haemorrhage continues after 4 units of red blood cells (RBCs) and haemostatic tests are unavailable, administer 4 units of FFP.
- Platelet concentrates Administer 1 pool of platelets if haemorrhage is ongoing and platelet count less than 75 9 109/l.
- Cryoprecipitate Administer 2 pools of cryoprecipitate if haemorrhage is ongoing and fibrinogen less than 2 g/l.
- Keep the woman warm using appropriate available measures

Main therapeutic goals of the management is maintaining:

- Hb greater than 80 g/l
- Platelet count greater than 50 x109/l
- Prothrombin time (PT) less than 1.5 times normal
- (APTT) less than 1.5 times normal activated partial thromboplastin time .
- Fibrinogen greater than 2 g/l.
- The routine use of rFVIIa is not recommended in the management of major PPH unless as part of a clinical trial.

6.2.3 Assess Etiology:

- o explore uterus and lower genitaltract (vagina, perineum, cervix)
- o Review history for risk factors,and observe blood loss

6.2.4 · ***Lab Tests:***

- o CBC,

- Coagulation screen,
- Group and cross match dependingon blood loss
- Urea and electrolytes

STEP 2:- **Directed therapy**: bimanual massage uterus, (**Tone)**

- **Drugs**

Drug	**Dose**	**Remark**
Oxytocin	· 10 IU IM · 5 IU IV push · 20 to 40 IU in 500 ml compound sodium lactate, infused IV in 1 hr& later at rate of 150ml/hr	Consider ability of the medication to reach uterus with poor tissue perfusion.
Syntometrin (0.5 mgm ergomtrine +5 units oxytocin)	5 mgm IM	· Can be repeated every 2 hrs · Contraindicated in women with hypertension
Misoprostol	800 to 1000 µg rectal	Longer lasting effects than with oral dose
15-methyl prostaglandin (carboprost tromethamine [Hemabate])	250µgm IM or intramyometrially	· Repeated every 15 minutes to a maximum of 2 mg (8 doses). · Asthma relative contraindication.
Carbetocin 1b (if available)	100 µg IM or IV over 1 minute	Prolonged action (replaces oxytocin infusion)

- Removal of placental tissue **(Tissue)**
- Repair of lacerations, identify rupture uterus and correct inversion which is very rare **(Trauma)**

STEP 3:-Activate massive blood transfusion protocol

- Local control-manual compressionof uterus, packing of uterus
- Balloon tamponade
- Embolisation
- Continue BP monitoring and bloodproducts infusion
- FFP in Coagulopathy, 2-6 units IV
- Platelets in thrombocytopenia,6-10 units IV
- PRBC's, 2-4 units IV
- Cryoprecipitate in Coagulopathy with low fibrinogen, 10-12 units IV

STEP 4:- Surgery:

- B- Lynch suture
- Sandwich technique with Bakriballoon inside uterus + B Lynch suture
- Compression sutures
- Devascularization of uterus by ligation of uterine arteries, internal iliac arteries
- Hysterectomy

STEP 5:-

In case of post hysterectomy bleeding, abdominal packing and angiographic embolization

7.0Evaluation of response

Monitor Vitals, acid–base status, consider CVP line,hourly intake output charting, order regular CBC and coagulation tests to guideblood component therapy.

8.0 Fluid Therapy in Massive PPH

Crystalloids	Upto 2 litres hartman's solution
Colloids	1-2 litres colloids till blood arrives
Blood	Cross matched, group specific as per blood loss estimation
Fresh Frozen Plasma	Ratio 1:1, blood :FFPs, or PT/ APTT >1.5 times normal

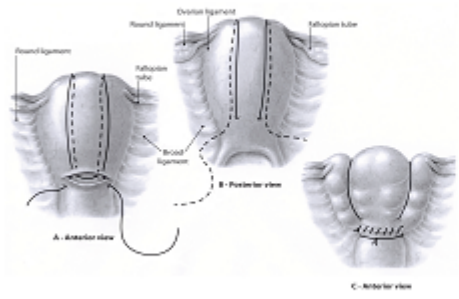
Platelets	If Platelet counts < 50 X10^9
Cryprecipitate	If fibrinogen < 1 g

9.0 Blood Component Therapy

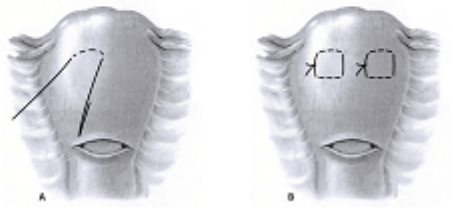
Product	Volume (ml)	Contents	Effect
Packed red cell	240	Red blood cell, white blood cell, plasma	Increase haematocrit by 3% , Hemoglobin by 1 g/dl
Platelet	50	Red blood cell, white blood cell, plasma	Increase platelet count by 5000 – 10,000 MM^3 per unit
Fresh Frozen Plasma	250	Fibrinogen Antithrombin III, Factor V & VIII	Increase Fibrinogen by 10 mg/dl
Cryoprecipitate	40	Fibrinigen, Factor VIII, XIII,von Willebrand factor	Increase Fibrinogen by 10 mg/dl

10. Surgical management

B –Lynch Compression sutures



Cho Uterine compression suture



After managing major PPH women should be montored in Intensive and high dependency units depending upon clinical need with close monitoring of MEOWS chart and Recurrent bleed.

- Documentation is very important and the sequence of events, staff in attandance, drugs and surgical procedures if performed and the patients condition should be clearly recorded in the patients records.

11. Secondary PPH

•In women presenting with secondary PPH, an assessment of vaginal microbiology should be performed (high vaginal and endocervical swabs) and appropriate use of antimicrobial therapy should be initiated when endometritis is suspected.
•A pelvic ultrasound may help to exclude the presence of retained products of conception (RPOC), although the diagnosis of retained products is unreliable.
•Surgical evacuation of retained placental tissue should be undertaken or supervised by a senior member of the team

12 Debriefing
An opportunity to discuss the events surrounding the obstetric haemorrhage should be offered to the woman (possibly with her relative), preferably by Parent team Consultant /Senior Specialist.
Incident reporting

11.0 References

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