PPH

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- Primary postpartum haemorrhage (PPH) is the most common form of major obstetric haemorrhage.
- the loss of 500 ml or more or any blood loss that caused hemodynamic instability of blood from the genital tract within 24 hours of the birth of a baby.
- PPH can be minor (500–1000 ml) or major (more than 1000 ml).
- can be further subdivided into moderate (1001–2000 ml) and severe (more than 2000 ml).
- In women with lower body mass (e.g. less than 60 kg), alower level of blood loss may be clinically significant.

TABLE 1	CLINICAL FINDINGS IN PPH			
	Degree of Shock			
	Compensation	Mild	Moderate	Severe
Blood loss	500-1000 ml 10-15%	1000-1500 ml 15-25%	1500-2000 ml 25-35%	2000-3000 ml 35-45%
Blood Pressure Change (systolic pressure)	none	slight fall (80-100 mmHg)	marked fall (70-80 mmHg)	profound fall (50-70 mmHg)
Symptoms and Signs	palpitations dizziness tachycardia	weakness sweating tachycardia	restlessness pallor oliguria	collapse air hunger anuria

Tone	uterine distension (multiple gestation, polyhydramnion, foetal macrosomia) uterotonics quick or prolonged labour (long) oxytocin exposure chorioamnionitis uterus myomatosus
Tissue	retained placenta abnormal placental implantation (placenta adhaerens, accreta / increta / percreta)
Trauma	vulvovaginal injury episiotomy / perineal suture uterine rupture inversion of the uterus
Thrombin	gestational: thrombocytopenia with HELLP syndrome, DIC (i.e., with preeclampsia, intrauterine foetal death, placental abruption, amniotic fluid embolism) other: VWD, plasmatic coagulopathies, platelet function disorders, factor deficiencies (loss, consumption, dilution)

Etiology	Primary Problem	Risk Factors, Signs
Abnormalities of uterine contraction—atony	Atonic uterus	Prolonged use of oxytocin High parity Chorioamnionitis General anesthesia
	Over-distended uterus	Twins or multiple gestation Polyhydramnios Macrosomia
	Fibroid uterus	Multiple uterine fibroids
	Uterine inversion	Excessive umbilical cord traction Short umbilical cord Fundal implantation of the placenta
Genital tract trauma	Episiotomy Cervical, vaginal, and perineal lacerations Uterine rupture	Operative vaginal delivery Precipitous delivery
Retained placental tissue	Retained placenta Placenta accreta	Succenturiate placenta Previous uterine surgery Incomplete placenta at delivery
Abnormalities of coagulation	Preeclampsia Inherited clotting factor deficiency (von Willebrand, hemophilia) Severe infection Amniotic fluid embolism Excessive crystalloid replacement Therapeutic anticoagulation	Abnormal bruising Petechia Fetal death Placental abruption Fever, sepsis Hemorrhage Current thromboembolism treatment

prevention

- Antenatal anaemia should be investigated and treated appropriately a
- Active management of the third stage of labour wich involves (the use of uterotonics, early clamping of the umbilical cord and controlled cord traction) to expedite delivery of the placenta
- Uterotonics (10iu oxytocin im after vaginal delivery , 5iu oxytociniv after cs
- Ergometrine could be used if no contraindication
- Carbetocin (100 micrograms given as an intravenous bolus over 1 minute) should be used for the prevention of PPH in cesarean section
- Tranexemic in dose of 0.5 – 1 mg intravenously could be used after vaginal or cesarean delivery (not routine)

Assessment

- As visual estimation often underestimates blood loss more accurate methods may be used, such as blood collection drapes for vaginal deliveries55 and the weighing of swabs
- Clinical signs and symptoms of hypovolaemia should be included in the assessment of PPH
- the signs of hypovolaemic shock become less sensitive in pregnancy. pulse and blood pressure are usually maintained in the normal range until blood loss exceeds 1000 ml;
- tachycardia, tachypnoea and a slight recordable fall in systolic blood pressure occur with blood loss of 1000–1500 ml.
- A systolic blood pressure below 80 mmHg, associated with worsening tachycardia, tachypnoea and altered mental status may indicate loss of >1500 ml

- Relevant staff with an appropriate level of expertise should be alerted of PPH.
- The midwife in charge and the first-line obstetric and anaesthetic staff should be alerted if PPH is minor (500-1000)
- A multidisciplinary team involving senior members of staff should be summoned to attend to women with major PPH

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

MAJOR PPH

- Immediate venepuncture (20 ml) for:
  - -cross-match (4 units minimum)
  - -full blood count
  - -coagulation screen, including fibrinogen
  - -renal and liver function for baseline
- monitor temperature every 15 minutes
- continuous pulse, blood pressure recording and respiratory rate (using oximeter, electrocardiogram and automated blood pressure recording)
- Foley catheter to monitor urine output
- two peripheral cannulae, 14 gauge
- consider arterial line monitoring (once appropriately experienced staff available for insertion)
- consider transfer to intensive therapy unit once the bleeding is controlled or monitoring at high dependency unit on delivery suite, if appropriate

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 75×10^9/l.
Cryoprecipitate	Administer 2 pools of cryoprecipitate if haemorrhage is ongoing and fibrinogen less than 2 g/l.

therapeutic goals

- Hb greater than 8 g/dl
- platelet count greater than 50×10^9/l
- prothrombin time (PT) less than 1.5 times normal
- activated partial thromboplastin time (APTT) less than 1.5 times normal
- fibrinogen greater than 2GM/dl

rFVIIa (NovoSeven)

- an expensive product that is licensed for the treatment of bleeding episodes in patients with specific inherited bleeding disorders.
- Outwith its licence, it has been used primarily in the management of uncontrolled haemorrhage in the trauma setting.
- It reduces blood loss through enhancement of tissue factor-dependent coagulation.
- Its effectiveness is markedly diminished by hypothermia, acidosis and low platelets, so effective resuscitation towards normal physiology is a prerequisite

- Careful clinical examination is required to determine the cause of PPH

Check for uterine atony by palpating the uterine fundus

Examine the vagina and cervix to rule out lacerations; repair if present

USS to check for retained products

Coagulation profile

Atony

- palpate the uterine fundus and rub it to stimulate contractions (‘rubbing up the fundus’)
- ensure that the bladder is empty (Foley catheter, leave in place)
- oxytocin 5 iu by slow intravenous injection (may have repeat dose)
- ergometrine 0.5 mg by slow intravenous or intramuscular injection (contraindicated in women with hypertension)
- oxytocin infusion (40 iu in 500 ml isotonic crystalloids at 125 ml/hour) unless fluid restriction is necessary
- carboprost 0.25 mg by intramuscular injection repeated at intervals of not less than 15 minutes to a maximum of eight doses (use with caution in women with asthma)
- misoprostol 800 micrograms sublingually

Surgical management

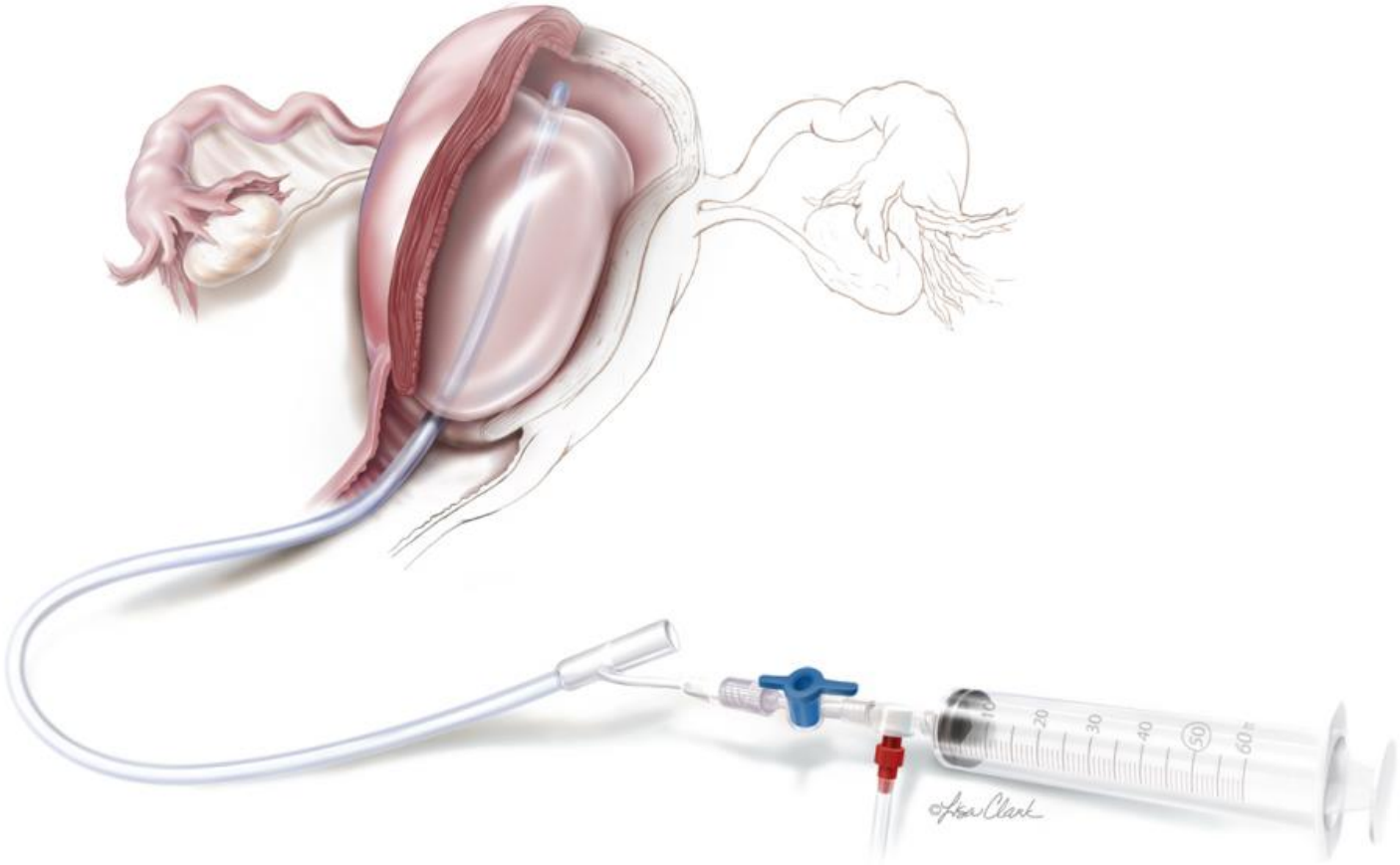
- Conservative surgical interventions may be attempted as second line, depending on clinical circumstances and available expertise

- Intrauterine balloon tamponade

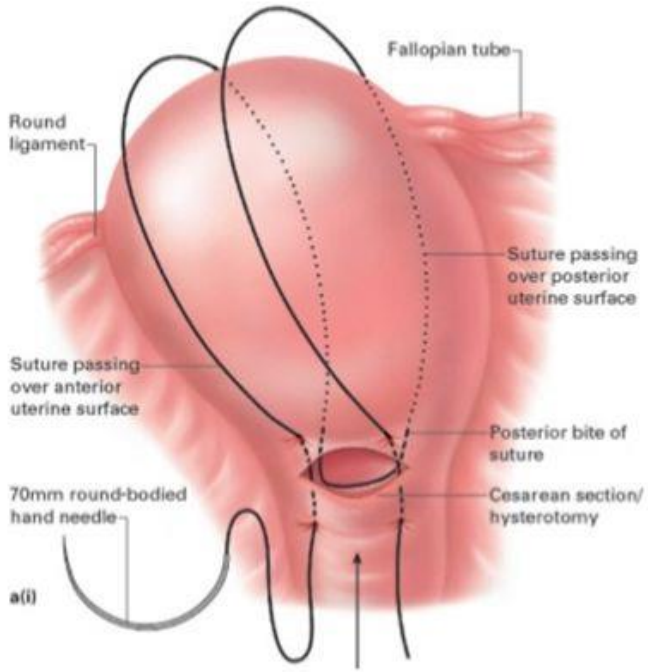
first-line ‘surgical’ intervention for most women where uterine atony is the only or main cause of haemorrhage.

- hemostatic brace suture :

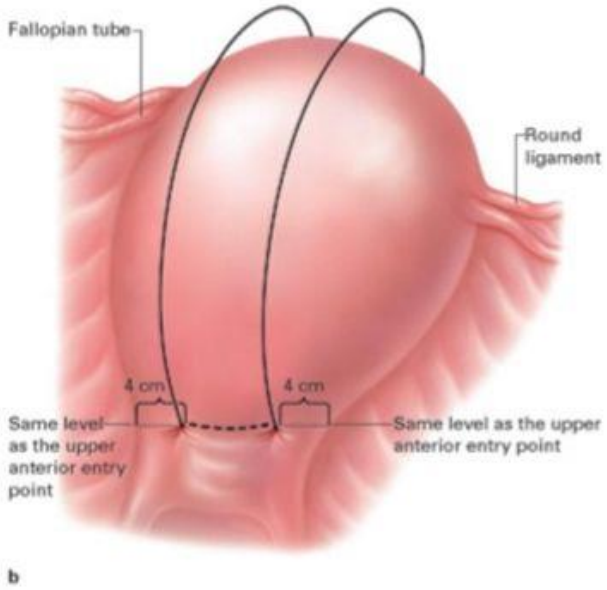
The best known version of is described by B-Lynch in requires hysterotomy for its insertion and its particularly suitable when the uterus is opened for cesarean section



B-Lynch Suture



Anterior



Posterior

Second line surgical management

❑Stepwise uterine devascularisation

the successive ligation of :

- one uterine artery
- both uterine arteries
- one ovarian artery and
- both ovarian arteries

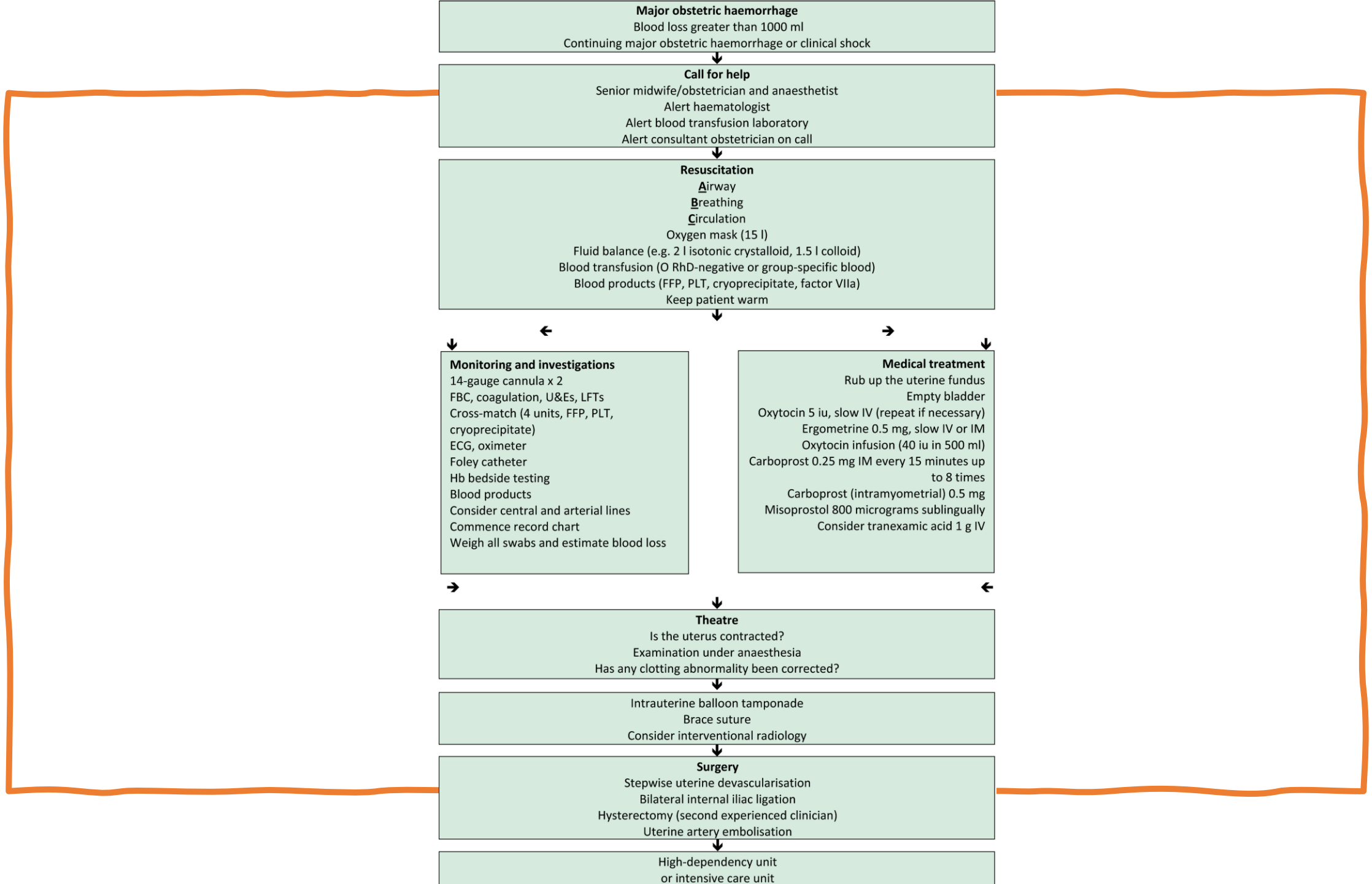
❑Bilateral internal iliac ligation

Alternatives

- Selective arterial occlusion or embolisation by interventional radiology
- Cesarean delivery, disseminated intravascular coagulation and transfusion of more than 10 units of packed red cells were related to failed embolization

- Resort to hysterectomy sooner rather than later (especially in cases of placenta accreta or uterine rupture

- Ideally and when feasible, a second experienced clinician should be involved in the decision for hysterectomy


Major obstetric haemorrhage
Blood loss greater than 1000 ml
Continuing major obstetric haemorrhage or clinical shock
Call for help
Senior midwife/obstetrician and anaesthetist
Alert haematologist
Alert blood transfusion laboratory
Alert consultant obstetrician on call
Resuscitation
Airway
Breathing
Circulation
Oxygen mask (15 l)
Fluid balance (e.g. 2 l isotonic crystalloid, 1.5 l colloid)
Blood transfusion (O RhD-negative or group-specific blood)
Blood products (FFP, PLT, cryoprecipitate, factor VIIa)
Keep patient warm
Monitoring and investigations
14-gauge cannula x 2
FBC, coagulation, U&Es, LFTs
Cross-match (4 units, FFP, PLT, cryoprecipitate)
ECG, oximeter
Foley catheter
Hb bedside testing
Blood products
Consider central and arterial lines
Commence record chart
Weigh all swabs and estimate blood loss
Medical treatment
Rub up the uterine fundus
Empty bladder
Oxytocin 5 iu, slow IV (repeat if necessary)
Ergometrine 0.5 mg, slow IV or IM
Oxytocin infusion (40 iu in 500 ml)
Carboprost 0.25 mg IM every 15 minutes up to 8 times
Carboprost (intramyometrial) 0.5 mg
Misoprostol 800 micrograms sublingually
Consider tranexamic acid 1 g IV
Theatre
Is the uterus contracted?
Examination under anaesthesia
Has any clotting abnormality been corrected?
Intrauterine balloon tamponade
Brace suture
Consider interventional radiology
Surgery
Stepwise uterine devascularisation
Bilateral internal iliac ligation
Hysterectomy (second experienced clinician)
Uterine artery embolisation
High-dependency unit
or intensive care unit

Secondary PPH

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

- **Causes :**
- Endometritis
- Retained placental tissue
- Sub-involution of placental site
- Pseudo-aneurysms and arteriovenous malformations (rare)

- assessment of vaginal microbiology should be performed (high vaginal and endocervical swabs) and appropriate use of antimicrobial therapy (combination of clindamycin and gentamicin) 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 an experienced clinic