POSTPARTUM HAEMORRHAGE (PPH)

INTRODUCTION
Haemorrhage is the sixth commonest cause of direct maternal death (CMACE 2011). Obstetric haemorrhage can quickly become life-threatening

RECOGNITION AND ASSESSMENT
- Normal blood volume from 13/40 is approximately 100 mL/kg
- Acceptable blood loss at vaginal delivery is 500 mL
- Acceptable blood loss at caesarean section is 1000 mL

Primary postpartum haemorrhage
- Excessive blood loss at or after delivery of fetus (see above for volumes) in first 24 hr. Affects approximately 5% of all deliveries in the UK

Secondary postpartum haemorrhage
- Excessive blood loss from genital tract >24 hr after birth and within 12 weeks of delivery

Blood loss
Definition
- Loss of >500 mL of blood from genital tract within 24 hr of birth of baby
- Minor: 500–1000 mL
- Major: divided into:
  - moderate: 1,000–2,000 mL
  - severe: >2,000 mL

Blood loss >20% must be treated

PREVENTION

Table 1: Risk factors

<table>
<thead>
<tr>
<th>Antepartum</th>
<th>Intrapartum</th>
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<tbody>
<tr>
<td>Hypertensive diseases in pregnancy</td>
<td>Prolonged third stage</td>
</tr>
<tr>
<td>Multiple pregnancy</td>
<td>Augmented labour</td>
</tr>
<tr>
<td>Previous PPH</td>
<td>Assisted delivery</td>
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<tr>
<td>Previous caesarean section</td>
<td>Episiotomy</td>
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<tr>
<td>Antepartum haemorrhage</td>
<td>Caesarean section</td>
</tr>
<tr>
<td>Obesity</td>
<td>Shoulder dystocia</td>
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<tr>
<td>Age &gt;40 yr</td>
<td>Big baby</td>
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<tr>
<td>Anaemia</td>
<td></td>
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Table 2: Cause of haemorrhage (the four T’s)

<table>
<thead>
<tr>
<th>4 T’s</th>
<th>Specific cause</th>
<th>Relative frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – Tone</td>
<td>Atonic uterus</td>
<td>70%</td>
</tr>
<tr>
<td>B – Trauma</td>
<td>Cervical, vaginal or perineal lacerations</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Pelvic haematoma</td>
<td></td>
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<tr>
<td></td>
<td>Inverted uterus</td>
<td></td>
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<td></td>
<td>Uterine rupture</td>
<td></td>
</tr>
<tr>
<td>C – Tissue</td>
<td>Retained tissue</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Invasive placenta (accreta)</td>
<td></td>
</tr>
<tr>
<td>D – Thrombin</td>
<td>Coagulopathies</td>
<td>1%</td>
</tr>
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</table>
Prevention is better than cure – follow the following principles

- Women at increased risk of bleeding, 'active management' of third stage advised
- Give oxytocic [either syntometrine (ergometrine and oxytocin) or oxytocin 10 units IM (unlicensed) or 5 units by slow IV bolus] in third stage

**IMMEDIATE MANAGEMENT (ALL PPH)**

- **Summon help** – senior obstetrician, anaesthetist, senior midwife and ancillary staff if necessary
- **Consider:**
  - A – AIRWAY – check airway not compromised
  - B – BREATHING – oxygenate with 15 L/min oxygen via face mask
  - C – CIRCULATION – obtain venous access – insert large bore 14 or 16 gauge cannula and take bloods for FBC, clotting screen, group & save and crossmatch if required (see **Major haemorrhage** below)
- Palpate uterus for atony and commence fundal massage. Consider bimanual compression
- **If woman did not receive syntometrine for management of third stage** and has not been hypertensive, and has had BP checked since admission, give ergometrine 500 microgram IM
- If required, give an antiemetic
- **Empty bladder** to assist with uterine contraction
- **Commence oxytocin** infusion using local regimen for postpartum
- **Monitor** physiological observations as per local practice
- **Document** fluid balance

**MASSIVE OBSTETRIC HAEMORRHAGE**

- Simultaneously perform resuscitation, monitoring, arresting bleeding and communication

**In first instance – follow management as above**

- **Estimate blood loss** by direct observation of overt blood loss **AND** clinical signs of intra-abdominal blood loss
- **Summon help:**
  - obstetric registrar
  - anaesthetist
  - senior midwives (e.g. midwife co-ordinator and another experienced midwife)
  - other personnel (e.g. porter/auxiliary/HCA to run errands etc)

**Bloods**

- **Canulate** (insert two 14 or 16 gauge venous cannulae – one in each arm) and take blood for:
  - FBC
  - APTT
  - PT (INR)
  - crossmatch (at least 4 units of packed red cells)
- **Consider taking blood for APTT, PT (INR), U&E, creatinine and Kleihauer**
- **Clotting is particularly important if the bleeding has been over a period of time**

**Fluids and fluid balance**

- **Give fluids** – one litre compound sodium lactate (Hartmann’s) solution stat
- Follow with blood, colloid or crystalloid as indicated by availability, blood loss and woman’s haemodynamic state
- Do not give more than 3.5 L clear fluids [up to 2 L compound sodium lactate (Hartmann’s) solution and 1.5 L colloid] while waiting for blood
- Insert urinary catheter with hourly urimeter attached and maintain urine output >0.5 mL/kg/hr
Blood transfusion
- Use local trigger phrase for massive obstetric haemorrhage:
  - when requesting blood products from the biomedical scientist for haematology
  - when contacting porters
  - to communicate the urgency of the need for blood products
  - Prepare blood/fluid warmer(s) to use as soon as possible especially for blood products
  - Keep woman warm
  - Transfuse crossmatched packed cells as required
  - In a dire emergency, consider requesting type specific blood
  - Fresh frozen plasma (FFP) usually required if four units of packed red cells are given

Oxygen
- 15 L/min oxygen via face mask initially, with woman lying flat

Monitoring
- Attach non-invasive blood pressure (NIBP) cuff
- Monitor and record hourly on HDU chart:
  - BP
  - pulse
  - \( \text{SpO}_2 \) (maintain at >95%)
  - respiratory rate
  - urine output
  - core temperature

Inform
For massive obstetric haemorrhage, use local trigger phrase to communicate the seriousness of the situation clearly
- Consultant obstetrician (who will usually attend as soon as possible)
- Consultant anaesthetist (expected to attend if woman going to theatre)
- Theatre team (even if not immediately going to theatre)
- Haematology biomedical scientist to allow them to prepare for major haemorrhage
- Haematologist if:
  - blood products other than 4 units of packed cells and 4 units of FFP are required, or
  - if there is ongoing haemorrhage after this has been given or
  - if clotting studies are abnormal
  - Consider involving surgical colleagues as required

Specific treatment
- For causes of haemorrhage (4 Ts) including surgery – see Tone (uterine atony), Trauma, Tissue and Thrombin below
  - commonest cause is uterine atony
- If surgery to be carried out for major PPH, it is usual to obtain consent for hysterectomy
- Involve consultant with greater gynaecological surgical experience in complex cases.
  Consider contacting interventional radiologist

Repeat blood tests
- FBC
- APTT
- PT (INR)
- \( \text{Ca}^{2+} \), Fibrinogen +/- blood gases
Reassess

- State of haemorrhage and woman’s physiological state after initial resuscitation

Central venous and arterial lines

- If continuing haemorrhage (or haemorrhage >40 mL/kg) or need to go to theatre for second time, insert CVC and arterial lines (and monitor CVP and BP directly)
- Use early if cardiovascular system compromised by disease

Table 3: Blood product replacement

<table>
<thead>
<tr>
<th>Blood product</th>
<th>Indication</th>
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<tbody>
<tr>
<td><strong>Haemoglobin</strong></td>
<td>Give fully crossmatched blood if possible. If insufficient time, give type specific and, only as an absolute necessity, give O negative blood</td>
</tr>
<tr>
<td><strong>Fresh frozen plasma (FFP)</strong></td>
<td>Avoid dilutional coagulopathy by early and adequate use of FFP (and other blood products as required)</td>
</tr>
<tr>
<td><strong>Platelets</strong></td>
<td>Give when count &lt;50 x 10^9/L or significant ongoing bleeding with a count of &lt;75 x 10^9/L or on consultant haematologist advice</td>
</tr>
<tr>
<td><strong>Cryoprecipitate</strong></td>
<td>Give if fibrinogen levels &lt;100 mg/L and on consultant haematologist advice</td>
</tr>
<tr>
<td><strong>Recombinant factor VIIIa</strong></td>
<td>Give only on consultant haematologist advice – 90 microgram/kg repeated 2-hrly if necessary</td>
</tr>
<tr>
<td><strong>Tranexamic acid IV</strong></td>
<td>If recommended by consultant haematologist</td>
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Hypocalcaemia

- Suspect if massive (>10 units blood) transfusion with ongoing hypotension, check Ca^{2+}. Give 10–20 mL calcium gluconate 10% by IV infusion over 10 min. Ensure ECG monitoring when administering calcium gluconate

Support for woman and family

- Within a reasonably short time period, consultant obstetrician should counsel woman and her family providing explanation and significance of cause of haemorrhage
- Ideally midwife should remain with woman and family throughout the emergency situation

POST EVENT

Thromboprophylaxis

- Unless advised to be inappropriate by consultant obstetrician/anaesthetist, thromboprophylaxis is required regardless of mode of delivery once bleeding has settled
- These women are at increased risk of thromboembolism, consider anti-embolic stockings and other methods of mechanical thromboprophylaxis whilst being nursed in HDU, and give low molecular weight heparin

Non steroidal anti-inflammatory drugs

- Contraindicated for at least 12 hr after haemorrhage has settled and platelet count and renal function are normal

Documentation

- Ensure documentation completed with times, names etc

A TONE (UTERINE ATONY)

Immediate management

- Fundal massage, empty bladder and consider bimanual uterine massage
- **Oxytocin** – Start oxytocin infusion. Use local regimen for postpartum via volumetric pump
- Remember to inspect vulva, vagina and cervix for trauma/lacerations
• Consider a first or repeat dose of oxytocin 5 or 10 units by slow IV bolus (unlicensed), ergometrine 250 microgram IM with an antiemetic [contraindicated in pregnancy induced hypertension (PIH) or other significant cardiovascular disease], misoprostol 1000 microgram PR or 250 microgram carboprost (methyl prostaglandin F2 Hemabate® IM or intramyometrially (may be repeated up to every 15 min to a maximum of 2 mg)

Continuing bleeding
• If above measures fail to prevent ongoing or recurrent bleeding, suspect Trauma, Tissue (e.g. retained products of conception) or Thrombin (e.g. a coagulopathy)
• Consider surgical examination under anaesthesia
  • if woman haemodynamically stable, use pre-existent regional (epidural) anaesthesia
  • if woman not stable or (dilutional) coagulopathy present, use general anaesthesia
• If bleeding still not controlled, consider uterine cavity balloon tamponade, haemostatic brace suture, hysterectomy, uterine artery ligation/embolisation by an interventional radiologist etc
• A consultant obstetrician must be involved
• A second consultant opinion before hysterectomy can be helpful but hysterectomy should be performed sooner rather than later

B TRAUMA
Inverted uterus
• Degree of haemodynamic shock is often disproportionate to the volume of the haemorrhage
  • Replace uterus as soon as possible using manual, hydrostatic or surgical methods
• Anticipate massive haemorrhage
• Some women may experience a vasovagal episode (hypotension and bradycardia) during uterine replacement
• Run an oxytocin drip 40 units in 500 mL of sodium chloride 0.9% at 125 mL/hr through a pump for at least 4 hr after replacement

Uterine rupture
• See Uterine rupture guideline

Perineal trauma
• See Third and fourth degree perineal tears guideline and Perineal trauma guideline

Other
• Broad ligament haematoma
• Extra genital bleeding e.g. sub capsular liver rupture

C TISSUE
Retained placenta
• See Retained placenta guideline

Risk factors
• Previous retained placenta
• Caesarean section
• Placenta praevia
• D&C
• High parity or maternal age
• Once retained placenta diagnosed, inform anaesthetist
• Give prophylactic antibiotics – follow local policy
Placenta accreta/increta/percreta
- If attempts are made to separate adherent placenta (surgically/forcibly), expect massive haemorrhage
- If expected or actual haemorrhage, follow management plan for major obstetric haemorrhage
- One option, after consultant review, is to leave the placenta in situ and monitor woman very closely for signs of infection and bleeding in postnatal period

D THROMBIN
Inherited coagulopathies
- Several inherited conditions will give rise to excessive peripartum haemorrhage if incorrectly managed and not detected antenatally. Seek advice from consultant haematologist at earliest opportunity (ideally antenatally) about the investigation and treatment of these varied and uncommon conditions

Acquired coagulopathies
- Will often represent a form of Disseminated Intravascular Coagulation (DIC) and will usually result in continuing or worsening haemorrhage without blood product replacement therapy
- Suspect DIC in abruption, severe PIH, prolonged +/- infected retained fetus/products of conception, amniotic fluid embolism or prolonged/untreated hypovolaemic shock
- FBC, PT, INR, APTT, and APTTR in the first instance in all those conditions where there is a known associated complication of DIC
- If platelet count <50 x 10^9/L or INR >1.6, check fibrinogen and fibrinogen degradation products (FDP) levels
- Give platelets, FFP +/- cryoprecipitate as directed by investigations
- Seek advice of a consultant haematologist about treatment and further investigations