Guideline for the Management of Obstetric Haemorrhage

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1.0 Introduction

The guideline uses the terms 'woman' or 'mother' throughout. These should be taken to include people who do not identify as women but who are pregnant.

Obstetric haemorrhage was responsible for 14 maternal deaths in the Confidential Enquiry into Maternal Deaths and Morbidity 2017-2019.
Maternal mortality proportions by ICD-MM classification 2018-20, published in within the MBRRACE-UK - Saving Lives, Improving Mothers' Care 2022 - Core Report, revealed obstetric haemorrhage contributing to 6% of the maternal deaths.
Although there has been a decline in mortality, it is essential that maternity services continue to reduce the risks to women.

2.0 Objective

To describe the management of an obstetric haemorrhage.

3.0 Scope

All members of the multidisciplinary team involved in the provision of maternity/obstetric care should be aware of the contents of this document and be able to implement it within their professional scope of practice.

4.0 Main Body of the Document

4.1 Definitions

Antepartum Haemorrhage (APH): bleeding from the genital tract after the 24th week of pregnancy. It can occur at any time until the onset of labour and can be concealed or revealed (PROMPT 2017). There are no consistent definitions about the severity of APH. It is recognised that the amount of blood lost is often underestimated and that the amount of blood coming from the introitus may not represent the total blood lost (for example, in a concealed placental abruption). It is important therefore, when estimating the blood loss, to assess for signs of clinical shock. See Appendix 1 PROMPT table for clinical features of shock in relation to blood loss. The presence of fetal compromise or fetal demise is an important indicator of volume depletion.

- Spotting – staining, streaking or blood spotting noted on underwear or sanitary protection.
- Minor haemorrhage – blood loss less than 50 ml that has settled.
- Major haemorrhage – blood loss of 50–1000 ml, with no signs of clinical shock.
- Massive haemorrhage – blood loss greater than 1000 ml and/or signs of clinical shock.

Postpartum haemorrhage (PPH): is traditionally defined as a blood loss of 500ml or more within the first 24 hours after birth.

- A minor PPH is defined as a blood loss of 500-1000ml without clinical shock
- A major PPH is a blood loss greater than 1000 ml.
- Major can be further subdivided into:
    - moderate (1001–2000 ml)
    - severe (more than 2000 ml)

A secondary PPH is a blood loss of 500 ml or more occurring from 24 hours postpartum until 12 weeks postpartum.

4.2 Staff to be Involved

Senior staff MUST be involved at all stages in the woman's care when obstetric haemorrhage occurs.
In all cases of APH and PPH the midwife in charge and the registrar on call should be involved in the management. If further escalation is required for APH and PPH, the emergency bleep 2222 should be triggered and "obstetric emergency" declared.
Clear lines of communication must be in place between the Consultant Obstetrician, Consultant Anaesthetist, Haematologist and labour ward staff.

4.3 APH

4.3.1 Risk Factors

- smoking

- drug misuse
- placental abruption in a previous pregnancy

- risk factors for placental abruption:
  - pre-eclampsia
  - fetal growth restriction
  - non-vertex presentations
  - polyhydramnios
  - advanced maternal age
  - multiparity
  - low BMI
  - pregnancy following assisted reproductive techniques
  - intrauterine infection
  - premature rupture of membranes
  - abdominal trauma

4.3.2 Initial Assessment for APH

Management is dependent upon assessment of the maternal and fetal wellbeing. Initial assessment will determine whether urgent action is required. **In all cases the following action will be taken:**

- Review the woman's history and determine any pre-disposing factors.
- Where possible obtain a history from the woman.
- If the woman is unable to provide a history due to a compromised state, assess clinical wellbeing and commence resuscitation.
- Assess degree of bleeding (concealed/revealed) and consider possible causes.
- Assess pain (continuous pain is indicative of a placental abruption but consider labour if the pain is intermittent).
- Pain relief may be appropriate but do not give diclofenac (Voltarol) as it can affect clotting.
- Record maternal observations (Blood Pressure (BP), pulse, respirations, temperature, level of consciousness) and assess for signs of clinical shock.
- Abdominal palpation – assess presentation, contractions, uterine tenderness, rigidity (a tense "woody" uterus is a sign of a placental abruption).
- If patient stable, auscultate fetal heart rate (FHR) to detect presence and commence on external CTG if gestationally appropriate.
- Request medical review.
- Exclude placenta praevia **before** considering vaginal examination.
- Perform gentle speculum examination.
- If the woman is a negative blood group or has red cell antibodies obtain bloods for Kleihauer and give anti-D if appropriate.
- Consider bedside ultrasound scan if placental site is not known or to establish fetal viability if the fetal heart rate cannot be auscultated.
- Consider steroids and magnesium sulphate depending on the gestation and clinical situation.

4.3.3 Management of Minor APH (<50mls, settled)

- All women should be advised to be seen and assessed as above.
- Full blood count (FBC) and group and save (G&S) should be performed.
- A clotting screen would only be indicated if platelets are abnormal.
- Women presenting with spotting who are no longer bleeding and where placenta praevia has been excluded can go home after a reassuring initial clinical assessment.

All women with APH heavier than spotting and women with ongoing bleeding should remain in hospital at least until the bleeding has stopped. The pregnancy should be reclassified as 'high risk' and antenatal care should be consultant-led. Serial ultrasound for fetal growth should be performed to rule out intrauterine fetal growth restriction.

4.3.4 Management of Major APH (50-1000mls with no clinical shock)

- Admit the patient to the birthing centre.
- Consider IV access and fluid resuscitation/replacement dependent on the woman's clinical condition.
- Bloods should be sent for FBC, clotting, G&S/Crossmatch as appropriate for clinical situation, urea and electrolytes (U&Es) and liver function tests (LFTs).
- Continue to record maternal clinical observations every 15 minutes – (BP, pulse, respirations, level of consciousness and oxygen saturation) until stable and then record 4 – 12 hourly depending upon maternal condition. Keep the patient nil by mouth during this time.
- Record maternal temperature as indicated by clinical condition (as a minimum 12 hourly.)
- The pregnancy should be reclassified as 'high risk' and antenatal care should be consultant-led. Serial ultrasound for fetal growth should be performed to rule out intrauterine fetal growth restriction.
- Consider induction of labour at term in recurrent per vaginal bleeding.

4.3.5 Management of Massive APH (blood loss > 1000mls and/or signs of clinical shock)

Call for help

Activate the emergency buzzer to summon assistance.
Ask the first responder to dial the 2222 bleep stating "obstetric emergency"

- Experienced obstetrician
- Senior midwife
- Experienced anaesthetist
- Experienced neonatologist
- Additional support staff

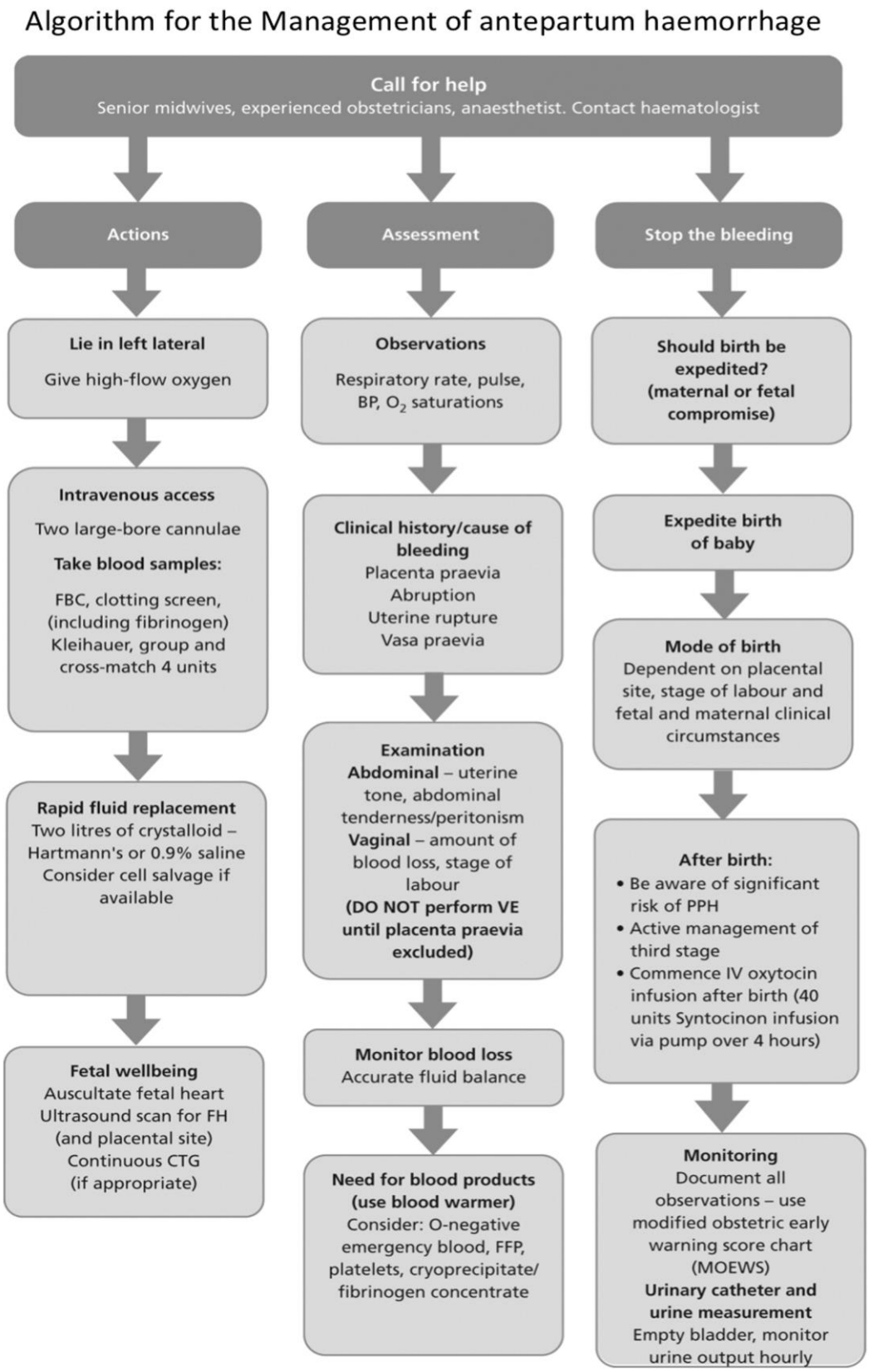
Alert the haematologist, blood bank technician and theatre staff to be on standby as the major obstetric haemorrhage protocol may be activated and management of the woman in theatre may be required (PROMPT 2017). The consultant obstetrician and anaesthetist should also be informed.

Immediate Actions

- Lie the woman in the left-lateral position or perform manual uterine displacement. Give high-flow oxygen with a non-rebreathe mask at 15 litres/min.
- Clinical observations (pulse, blood pressure, capillary refill and respiratory rate) at 5 to 15 minute intervals. Continuous SpO_2 monitoring.
- Site two large-bore intravenous cannulae
- Urgent blood samples: full blood count, Kleihauer (even if the woman is rhesus-positive – this will detect a maternofetal haemorrhage), clotting, U&Es and LFTs. request cross match (number of units will be dependent on condition)
- Rapid fluid resuscitation with 2 litres of crystalloid (all fluids should ideally be warmed)
- Fluid management:
    - Transfuse as soon as blood is available but infuse crystalloid (Plasmolyte) in the meantime.
    - The total volume of clear fluids infused should not exceed 3.5litres.
    - The obstetrician/anaesthetist should consider the transfusion of either uncross-matched group-specific or O negative blood if crossmatched, type-specific is not available.
    - Blood filters should not be used.
    - Commence a fluid balance chart.
    - Assess the need for blood products: Please follow Major Obstetric haemorrhage local protocol: appendix 2.
- Assess fetal wellbeing- auscultate fetal heart or commence continuous electronic fetal monitoring if at an appropriate gestation. Ultrasound should not be used as a primary tool to assess fetal wellbeing.
- Dial 2222 and summon help via the “obstetric emergency” bleep.
- The anaesthetist may request the presence of an ODP.
- The senior obstetrician/anaesthetist will request the initiation of the MOH Protocol (Appendix 2).
- Obtain the “obstetric emergency” trolley and defibrillator.
- Assess level of consciousness, pain and blood loss.
- Catheterise and commence hourly urine measurements
- A senior Obstetrician will determine the timing and mode of delivery.
- Regardless of the gestation the mother’s life should take priority, she should be resuscitated and stabilised before any decision is made regarding delivery of the baby.
    - Women with APH and associated maternal and/or fetal compromise require immediate delivery.
    - Vaginal delivery is recommended where intrauterine fetal death (IUFD) has occurred provided the maternal condition is satisfactory and there is no active bleeding.
    - Cervical assessment will determine whether labour has commenced.
    - If there is any deterioration of maternal or fetal condition, Caesarean section. may be appropriate, this decision will be made by the Consultant Obstetrician.
- Following delivery women should be cared for in enhanced care with multidisciplinary team management.
    - Postnatal risk assessment for venous thromboembolism (VTE) should be completed and thromboprophylaxis considered depending on clinical condition and haematological parameters.
    - Debriefing by an appropriate clinician will be required.

4.3.6 PROMPT algorithm for the initial management of major APH

PROMPT Practical Obstetric Multi-Professional Training



4.3.7 Management of the 3rd Stage of Labour when APH has Occurred

- Consider APH as a risk factor for PPH.
- Recommend active management of the 3rd stage.
- Syntometrine is the drug of choice in cases of placental abruption/placenta praevia if the woman is not hypertensive.

4.3.8 Care of the Neonate after APH

- Causes of major/massive APH can result in fetal compromise and the infant should be reviewed by a paediatrician following delivery.
- Consider fetal anaemia in cases of confirmed or suspected abruption or vasa praevia.
- **Do not delay cord clamping in these circumstances.**
- In cases of minor APH paediatric assessment will depend upon the condition of the infant at delivery.

4.4 PPH

This guideline outlines the principles of care for the management of a primary PPH (within the first 24 hours of delivery). The management of the woman's clinical condition following excessive postpartum blood loss will be the same irrespective of whether it is a primary or secondary haemorrhage.

4.4.1 Risk Factors for PPH

Pre-labour

- Previous PPH or retained placenta (recurrence rate of 8 to 10%).
- Previous caesarean section (associated with uterine rupture, placenta praevia, accreta, percreta.)
- Placenta praevia, accreta, percreta in current pregnancy.
- APH especially from placental abruption.
- Overdistension of the uterus (multiple pregnancy, polyhydramnios, macrosomia).
- Pre-eclampsia.
- Maternal weight <60 kilograms (less able to tolerate blood loss due to a smaller circulating volume).
- BMI > 35.
- Grand multiparty (para 4 or more).
- Existing uterine abnormalities e.g. fibroids.
- Chorioamnionitis.
- Pre-eclampsia.
- HB < 90 g/l at the onset of labour (less able to tolerate haemorrhage and increased uterine atony because of depleted uterine myoglobin levels necessary for muscle action.

Intrapartum

- Induction of labour.
- Prolonged first, second and third stage of labour.
- Use of oxytocin.

- Retained placenta.
- Precipitate labour.
- Operative vaginal birth.
- Caesarean section particularly in second stage of labour.
- Placental abruption.
- Pyrexia in labour.

4.4.2 Causes of PPH

- **Tone** – uterine atony 70-90% (Snowden et al., 2017).
- **Tissue** – retained placenta/membranes.
- **Trauma** – genital lacerations, vascular episiotomy/tear, cervical tear, uterine/scar rupture, uterine inversion.
- **Thrombin** – clotting disorders.

4.4.3 General Management

Management of a major PPH requires prompt initiation of a systematic approach with simultaneous resuscitation and treatment, early escalation, replacement of fluid, blood and clotting factors, use of an algorithm/pro forma and “helicopter view”.

4.4.4 Management of Minor PPH

- Diagnose the cause of the bleeding and manage as below:
  - IV access (one 14-gauge cannula).
  - Group and screen.
  - Full blood count.
  - Coagulation screen, including fibrinogen.
  - Full set of MOEWS observations every 15 minutes.
  - Commence warmed crystalloid infusion.

- Women who have stopped bleeding only require careful observation of:
  - General condition.
  - Abdominal pain, tenderness.
  - Uterine tone.
  - Blood loss.
  - Clinical observations to determine signs of deterioration.
  - Commence warmed crystalloid infusion.

- Women who continue to bleed or are symptomatic require management as per Moderate/Severe PPH.

4.4.5 Management of Moderate/Severe PPH

In addition to the above measures:

- Summon help, dial 2222 and state “obstetric emergency”.
- In cases of severe postpartum haemorrhage or where there is ongoing bleeding of >150mls/min the Major Haemorrhage Protocol (Appendix 2) will be initiated by the senior obstetrician/anaesthetist.

- The Obstetrician/Anaesthetist or delegated person will inform haematology that the major haemorrhage protocol has been initiated on **ext. 6181**. This is the major haemorrhage baton phone which is carried by a designated haematologist. Once contacted the haematologist is responsible for issuing the blood packs are per the algorithm and liaising with the obstetrician and/or anaesthetist managing the haemorrhage.
- Obtain the obstetric emergency trolley and defibrillator.
- **Commence PPH Proforma and MOEWS chart.**
- **Refer to PROMPT PPH management pathway as above.**
- **Oxytocin infusion:**
    - Syntocinon 40 units in 500mls of Normal Saline, infuse via IVAC pump at 125mls/hr initially then reassess.

<u>Process to follow if there are no infusion pumps available for infusion of 40 IU oxytocin in 500mls Sodium Chloride for postnatal care:</u>

- Dilute 40 IU Oxytocin in 36 mls Sodium Chloride.
- Administer IV at 10 mls an hour over 4 hours via Syringe driver / pump.

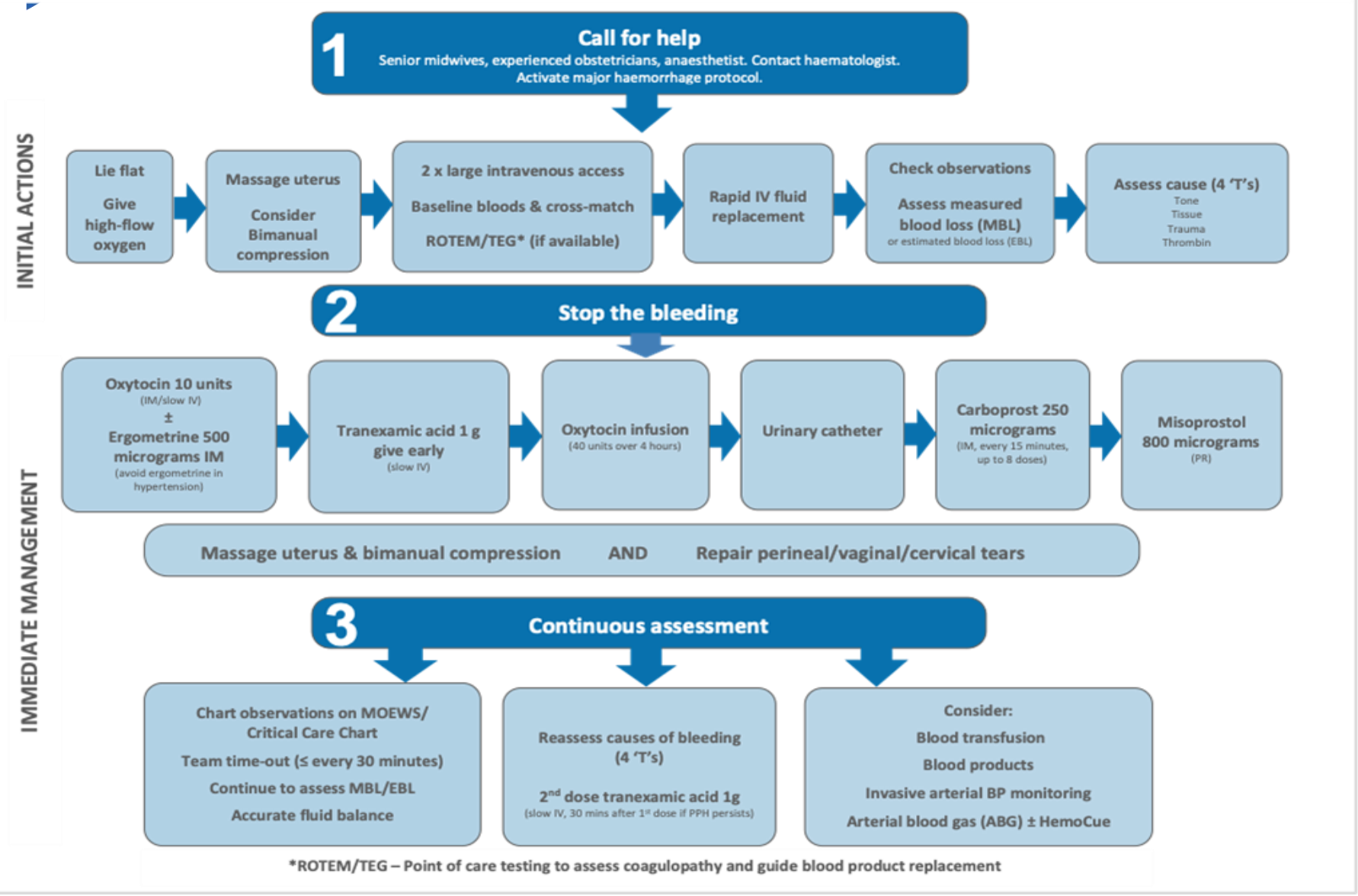
Fluid Replacement:

- 1 - 2 litres warmed crystalloid solution (e.g. Plasma-lyte) - then follow with 1 to 2 litres of warmed colloid solution (e.g. Haemaccel) until blood arrives.
- The maximum volume of clear fluids which can be infused is 3.5 litres.
    - Blood products should be transfused at this stage or earlier when clinically indicated.

PROUD to care

NHS
Barnsley Hospital
NHS Foundation Trust

Immediate management of major postpartum haemorrhage (PPH)



4.5 Blood Products Transfusion

Blood Products Transfusion	
Red Cells	Ideally give cross matched products. If cross matched blood unavailable give uncross-matched group specific blood or O rhesus negative blood.
Fresh Frozen Plasma	Give four units for every four units of red cells transfused **or** PT/ APTT >1.5 x normal (15-20ml/kg)
Platelets Concentrates	1 pool of platelets with Major Haemorrhage pack 2 or if PLT count <50
Cryoprecipitate	2 pools if fibrinogen < 2.0g/l and ongoing bleeding
N.B. If a woman refuses blood products pleases refer to the management plan in the notes and the guideline for Jehovah's Witness Patients And Others Who Refuse Blood Transfusions	

4.6 Post haemorrhage monitoring:

- Transfer the woman to enhanced care or ICU once stabilised dependent upon level of critical care required.
- Continue to record maternal clinical observations and vital signs via critical care monitor:
  - BP, pulse, respirations, temperature, level of consciousness and oxygen saturation every 15 minutes, as a minimum.
- Commence enhanced care chart.
- Consider Arterial/CVP line.
- Monitor blood loss and uterine tone continuously.
- Catheterise and monitor hourly urine.
- Fluid intake and output will be recorded either on the fluid balance or enhanced care chart, any positive or negative balance will be clearly documented in the records with an individual management plan based on the woman's condition.

4.7 If bleeding continues from uterine atony continue with the following action

Consider the use of:

- Misoprostol
  - 1000 micrograms rectally or 800 micrograms sublingually
- Hemabate (Carboprost)
  - 250 micrograms by deep intramuscular injection in the presence of an experienced registrar or Consultant (Medical staff may give it directly into the myometrium - the responsibility for the administration lies with the clinician as this method is not recommended).
  - **Never give IV**
  - Hemabate may be repeated every 15 minutes to a maximum dose of 2mg (8 doses).
  - Hemabate should not be administered to women with severe asthma or cardiac problems.

4.8 Fluid Resuscitation

Fluid resuscitation to restore the circulating volume is a priority in any major obstetric haemorrhage.

Fluid resuscitation and administration of blood products are key elements in the management of any major haemorrhage. Maternal blood loss must be measured by weighing the loss. Accurate weighing and an ongoing cumulative blood loss can help to initiate earlier recognition of the extent of the haemorrhage and support proactive management with minimal delay. Please see the SOP for weighing blood loss. Weighing blood loss.pdf (trent.nhs.uk)

4.9 Major Obstetric Haemorrhage Protocol (Appendix 2)

The Major Obstetric Haemorrhage (MOH) Protocol is a process agreed with the Haematology Department for issuing blood products in a co-ordinated and timely fashion and should be initiated at the discretion of the senior obstetrician/anaesthetist in cases of:

- Moderate PPH (blood loss ≥ 1000mls).
- Severe PPH (blood loss ≥ 2000mls).
- Women with signs of ongoing bleeding > 150mls/min and clinical shock.

NB the MOH protocol may be initiated earlier if the bleeding is extreme and/or the woman is clinically in shock or may not be required if the bleeding is under control and the woman is not in shock.
To initiate the protocol a senior clinician or designated midwife will contact Blood Bank and use the phrase **"I would like to activate the Major Obstetric Haemorrhage Protocol"** providing them with the following information:

- Name of the clinician in charge of the situation.
- Location of the woman.
- Contact details.
- Full patient demographics.
- Confirm that a G&S has been taken.

Blood bank will then issue the massive haemorrhage packs as required (see MOH protocol – appendix 2).

4.10 Point-of-care Testing

Point-of-care tests are increasingly being used to guide transfusion management as they reduce delay in the results of full blood counts and clotting screens from the laboratory. Examples include:

- Haemacue- provide an estimate of haemoglobin concentration within several seconds.
- Arterial or venous blood gas sample- can provide useful information on the patient status and provide. Serial measurements of pH, base excess and lactate will assist the anaesthetist in assessing the adequacy of the resuscitation. Some blood gas analysers will also provide a haemoglobin concentration (PROMPT 2017).

4.11 Access to Blood and Portering Arrangements

The Barnsley Birthing Centre (BBC) does not have a supply of blood products on site. All products need to be obtained from Blood Bank which is situated on the other side of the hospital from the BBC and main theatres. It will take ten minutes to get there to obtain blood. A nominated person/person should be available to obtain blood for the duration of the emergency. Any qualified or unqualified member of staff who has been trained to use the collection system can go for the blood.

In the rare event that porters are used they MUST be made aware of the absolute priority at the time of the collection of blood in emergencies over other tasks.

The haematologist will be informed as soon as the incident occurs to ensure that blood will be ready to collect by the time staff arrives in blood bank. In instances of massive haemorrhage more than two units can be made available.
O negative blood can be obtained from the top drawer of the cabinet in Blood Bank. The O Negative blood has a traceability tag on it and this must be completed by the staff using the blood. The patient's details MUST be recorded on the tag and the appropriate transfusion documentation completed.

Remember:

- If out of hours you need the key pad number to enter blood bank, which is **C20589**.
- Up to 4 units can be taken out at any one time:
  - You can only put one unit of blood in the cool box at a time sandwiched between four cool packs (these are kept with O negative blood).
  - Staff can take two boxes at a time and take up to two units in their hand.
  - The units carried in the hand have to be infused within 30 minutes.
  - Blood will keep for up to 2 hours in the cool box if not tampered with.
  - Once the box is opened it must be used within 30 minutes.
- Any blood brought from Blood Bank MUST be used or returned to Blood Bank within 2 hours of removing it from box.

4.12 Surgical Management

- If active bleeding continues despite the above intervention:
  - **Request theatre staff to attend.**
  - Transfer the woman to theatre and explore vagina, cervix and uterus to exclude genital tract trauma, uterine inversion or retained placental tissue.
  - Inform the consultant obstetrician of transfer to theatre.
  - Alert the on-call haematologist and urgently request a coagulation screen and cross match 2-4 further units of blood.
- Further interventions should then be considered as outlined below, choice should be made on an individual basis.

NB: The woman may be transferred to theatre earlier if the source of bleeding is identified as trauma or retained products.

4.12.1 Rusch Balloon Catheter

- Avoid in latex sensitivity (Bakri balloon may be used instead).
- Urological hydrostatic balloon catheter.
- Applies symmetrical pressure.
- Uterine packing not required.
- Easy to remove.
- Can be performed by the registrar after discussion with the consultant.
- Fewer risks than other surgical interventions.
- Available in obstetric theatre, antenatal enhanced care and main theatres.
- Indications
    - Severe atonic PPH not responding to pharmacological methods.
    - Severe PPH due to retained products if the patient continues to bleed following removal of retained products or for patients with adherent placental tissue who continue to bleed.
    - Severe PPH due to coagulation failure.
    - PPH due to uterine fibroids including sub mucous fibroids.
    - Secondary PPH.
- Contraindications
    - Traumatic PPH
- Prerequisites
    - General or regional anaesthetic in the operating theatre.
    - An assistant to help with equipment handling.
    - Consent for laparotomy and hysterectomy.
    - 100ml syringe, and 1litre warm fluid.
    - 2 vaginal retractors and 5 sponge forceps
    - IV antibiotics in theatre and until the catheter is removed.
    - Syntocinon infusion, 40 IU in 500mls to run over 4 hours.
    - Alert on call haematologist and urgently request a coagulation screen and crossmatch 2-4 units of blood.

<u>Description of procedure:</u>

- The procedure should be performed in theatre under regional or general anaesthesia
- An assistant is required.
- The woman is placed in the Lloyd Davies position.
- The bladder is then catheterised.
- Hold the cervix with 4 sponge holders if the patient had vaginal delivery
    - One sponge holder is placed in the anterior lip of the cervix, one on the posterior lip.
    - The other 2 forceps are used to reduce the cervical opening by placing them laterally on both sides, holding the anterior and posterior lips at the same time.
- The Rusch catheter is inserted into the uterine cavity using sponge holder forceps.
- Using 100ml bladder syringe, the catheter is inflated, via the drainage port and not the valve port, with 300-1000ml of warm saline#.
- The pressure required is equivalent to that used when inflating a Foley' catheter balloon.

- The vagina is then packed using ribbon gauze to keep the balloon in place especially when the cervix is fully dilated following vaginal delivery.
    - The pack is placed as follows: start packing the posterior fornix, then remove the sponge holder from the posterior lip, then pass the gauze over the cervix and pack the anterior fornix after removing the sponge holder from the anterior cervical loop, then pack both lateral fornices and remove both sponge holders.
- The woman should be transferred to enhanced care and the catheter and the pack remains in situ for 12-36 hours.

Removal

- The balloon should be removed between 9am and 3pm when the senior help is immediately available.
- Syntocinon infusion (40 units per 500mls normal saline over 24 hours) should be administered to maintain the uterine tone.
- Before removal of the balloon the woman should be fasted for 6 hours and obstetric theatre alerted.
- The balloon is removed in enhanced care.
- After 12-36 hours the fluid from the catheter is withdrawn gradually at a rate of 100ml. every 15 minutes and the last 200 ml can be withdrawn in one go.
- The vaginal pack is then removed.
- The time of this should be documented in the woman's case notes.
- Antibiotic cover is advised in the first 24 hours.

Potential problems**:**

- If you are faced with difficulty removing the fluid from the balloon then the most likely cause is kinking of the catheter and hence you need to remove part or all the vaginal pack.
  Women may continue to bleed in the enhanced care while the balloon is in place. You could inflate more fluid into the balloon (very rarely needed if you put the appropriate amount of the fluid in the balloon).
- The balloon can rupture (rare). If this happens remove the pack and the balloon and watch for bleeding. In most cases if the balloon was in place for 4 hours or move, the woman will not bleed and you do not need to replace it. If it happens very soon after insertion you would probably need to replace it.

4.12.2 B-lynch Suture

May be considered if the above measures have failed to control haemorrhage and the cause of blood loss is uterine atony. The test of potential efficacy of this technique is bimanual compression after exteriorising the uterus. The B lynch suture allows conservation of the uterus and fertility. (Diagrams and procedure are also on the wall in theatres).

Procedure:

The woman is placed in Lloyd Davies or semi-lithotomy position. The uterus is exteriorized and rechecked to identify any bleeding point, if the bleeding is diffuse then bi- manual compression is first tried to assess the potential chance of success of the B-Lynch technique.

First, the bladder peritoneum is reflected down below the cervix. The whole of the uterus is compressed by placing the hands anteriorly and posteriorly and fingers at the levels of the cervix. Simultaneously, the vagina is swabbed out to confirm adequate control of bleeding by the assistant. If the bleeding stops there is good chance that the B-Lynch suture will also stop the bleeding.
Throughout the placement of the suture, the assistant performs uterine compression with both hands. For a right-handed surgeon standing on the right side of the patient, the procedure is as follows:

Sutures:

No. 2 Vicryl suture on 70 mm round bodied hand needle or No.1 Monocryl suture on 90-cm curved ethigard blunt needle.

1. The suture is placed 3 cm from the right lower edge of the uterine incision and 3 cm from the right lateral border.
2. The suture is threaded through the uterine cavity to emerge at the upper incision margin 3 cm above and approximately 4 cm from the lateral border (the uterus widens from below).
3. The suture now visible is passed over the top of the uterus to the posterior side to compress the uterine fundus approximately 3 - 4 cm from the right cornual border.
4. The suture is fed posteriorly and vertically to enter the posterior wall of the uterine cavity at the level of the upper anterior entry point or uterine incision or at the insertion of uterosacral ligament.
5. The suture is pulled under moderate tension assisted by manual compression exerted by the assistant. The length of the suture is passed back posteriorly on the horizontal plane through the same surface marking as for the right side.
6. The suture is fed through posteriorly and vertically over the fundus to lie anteriorly and vertically, compressing the fundus on the left side. The needle is passed in 3cm above the upper uterine edge and 4cm medially and pushed into the cavity and then again through the lower segment 3 cm anteriorly and below the lower incision margin on the left side.
7. The two lengths of suture are pulled taught assisted by bi-manual compression to minimize trauma and achieve adequate compression. At this stage, the vagina is swabbed to check that the bleeding is controlled.
8. The tension on the two ends of the suture is maintained while the lower segment incision is closed in the normal way. Finally, the 2 ends of the B-Lynch suture are tied with double throw knot.
   (For diagram see appendix 3)

4.12.3 Bi-lateral Uterine Artery Ligation or Internal Iliac Artery Ligation

Both procedures minimise blood loss by reducing pulse pressure

4.12.4 Hysterectomy

Consider hysterectomy in cases of placenta accreta, uterine atony or where there is uterine atony and other causes of bleeding such as genital tract lacerations and uterine inversion have been excluded. It is good practice to seek the opinion of a second consultant before making

this decision. In cases of people declining use of blood products in their management early recourse to hysterectomy can be lifesaving.

4.12.5 Invasive Radiology - Pelvic Arterial Embolism

Pelvic arterial embolism is an option for control of post-partum haemorrhage which has failed to respond to the methods described above. In rare circumstances this may be considered for women who re bleed and are stable haemodynamically as an alternative to hysterectomy. This procedure is not undertaken at Barnsley Hospital. If this procedure is being considered, please contact the 'on call' vascular radiologists at the Royal Hallamshire Hospital (RHH) or Northern General Hospital (NGH).

4.13 Perioperative Cell Salvage

NICE recommendations are that, in obstetrics intraoperative cell salvage should be performed by multidisciplinary teams who develop regular experience of the procedure.
Women who request this facility should be referred to a Unit where intraoperative cell salvage is an option.

5.0 Roles and Responsibilities

5.1 Midwives

To provide the best evidence-based care for women in accordance with appropriate guidance from diagnosis to delivery. To initiate care as described in the guideline. To work as part of the multidisciplinary team in managing APH and PPH.

5.2 Obstetricians

To work as part of the multidisciplinary team in managing APH and PPH.

5.3 Paediatricians

To attend delivery when their presence is requested.

5.4 Anaesthetists

To attend when their presence is requested and provide analgesia/anaesthesia to the women for operations and procedures as appropriate. To work as part of the multidisciplinary team in managing APH and PPH.

6.0 Associated Documents and References

MBRRACE-UK. Mother and Babies: Saving Lives, Improving Mothers' Care 2016-2018. (December 2020).n
MBRRACE-UK_Maternal_Report_Dec_2020_v10_ONLINE_VERSION_1404.pdf (ox.ac.uk)
Alok et al. (1996) Tranexamic acid in the management of postpartum haemorrhage. Br j Obstet Gynaecol 103: 1250-1251
C.B-Lynch et al (1997) The B-Lynch surgical technique for the control of massive postpartum haemorrhage: and the alternative to hysterectomy? Five cases reported. Br J Obstet Gynacol. 104: 372-375

Johnson R, Kumar M, Obrhai M Young P. Management of massive postpartum haemorrhage: Use of a hydrostatic catheter to avoid laparotomy, Br J Obstet Gynaecol; 108: 420-422
Rapid Response Report NPSA /2010/017 the transfusion of blood and blood components in an emergency. October 2010 https://www.transfusionguidelines.org/document-library/documents/npsa-rapid-response-report-the-transfusion-of-blood-and-blood-components-in-an-emergency-21-october-2010-pdf-100kb
RCOG Green Top Guideline NO. 52 Prevention and Management of Postpartum Haemorrhage. December 2016. https://obgyn.onlinelibrary.wiley.com/doi/epdf/10.1111/1471-0528.14178
RCOG Green Top Guideline NO. 63. Antepartum Haemorrhage. November 2011. https://www.rcog.org.uk/globalassets/documents/guidelines/gtg_63.pdf
Yelland A, Winter C, Draycott T, Fox AR (2013). Midwifery staffing: variation and mismatch in demand and capacity. British Journal of midwifery https://www.magonlinelibrary.com/doi/abs/10.12968/bjom.2013.21.8.579?journalCode=bjom
Aiken LH, Sloane D, Griffiths P, et al. Nursing skill mix in European hospitals: cross-sectional study of the association with mortality, patient ratings and quality of care. BMJ https://pubmed.ncbi.nlm.nih.gov/28626086/
Snowden JM, Kozhimannil KB, Muoto I, Caughey AB, McConnell KJ (2017). A 'busy day' effect on perinatal complications of delivery on weekends: a retrospective cohort study. BMJ. https://qualitysafety.bmj.com/content/26/1/e1

7.0 Training and Resources

Training will be delivered as outlined in the Maternity Training Needs Analysis. This is updated on an annual basis.

8.0 Monitoring and Audit

Any adverse incidents relating to the guideline for obstetric haemorrhage will be monitored via the incident reporting system. Any problems will be actioned via the case review and root cause analysis action plans. The action plans are monitored by the risk midwife to ensure that improvements in care are made. The trends and any root cause analysis are discussed at the monthly risk meetings to ensure that appropriate action has been taken to maintain safety.
The guideline for obstetric haemorrhage will be audited in line with the annual audit programme, as agreed by the CBU. The audit action plan will be reviewed at the monthly risk management meetings on a quarterly basis and monitored by the risk midwife to ensure that improvements in care are made.

9.0 Equality and Diversity

This section is mandatory for all Trust Approved Documents and must include the statement below:

The Trust is committed to an environment that promotes equality and embraces diversity in its performance as an employer and service provider. It will adhere to legal and performance requirements and will mainstream equality, diversity and inclusion principles through its policies, procedures and processes. This guideline should be implemented with due regard to this commitment.

To ensure that the implementation of this guideline does not have an adverse impact in response to the requirements of the Equality Act 2010 this policy has been screened for

relevance during the policy development process and a full equality impact assessment is conducted where necessary prior to consultation. The Trust will take remedial action when necessary to address any unexpected or unwarranted disparities and monitor practice to ensure that this policy is fairly implemented.

This guideline can be made available in alternative formats on request including large print, Braille, moon, audio, and different languages. To arrange this please refer to the Trust translation and interpretation policy in the first instance.

The Trust will endeavor to make reasonable adjustments to accommodate any employee/patient with particular equality, diversity and inclusion requirements in implementing this guideline. This may include accessibility of meeting/appointment venues, providing translation, arranging an interpreter to attend appointments/meetings, extending policy timeframes to enable translation to be undertaken, or assistance with formulating any written statements.

9.1 Recording and Monitoring of Equality & Diversity

This section is mandatory for all Trust Approved Documents and must include the statement below:
The Trust understands the business case for equality, diversity and inclusion and will make sure that this is translated into practice. Accordingly, all guidelines will be monitored to ensure their effectiveness.
Monitoring information will be collated, analysed and published on an annual basis as part of Equality Delivery System. The monitoring will cover the nine protected characteristics and will meet statutory employment duties under the Equality Act 2010. Where adverse impact is identified through the monitoring process the Trust will investigate and take corrective action to mitigate and prevent any negative impact.

Appendix 1

PROMPT Clinical features of shock in pregnancy related to the volume of blood loss

Blood loss	Clinical features	Level of shock
10% blood loss		
500 ml if 50 kg **800 ml if 80 kg**	Mild tachycardia Normal	Compensated
15% blood loss		
750ml if 50kg **1200ml if 80kg**	Tachycardia (>100bpm) Hypotension (systolic 90-80 mmHg) Tachypnoea (21-30 breaths/ minute) Pallor, sweating Weakness, faintness, thirst	Mild
30% blood loss		
1500ml if 50kg **2400ml if 80kg**	Rapid, weak pulse (120 bpm) Moderate hypotension (systolic 80-60 mmHg) Tachypnoea (>30 breaths/ minute) Pallor, cold clammy skin Poor urinary output (< 30 mL/hour) Restlessness, anxiety, confusion	Moderate
40% blood loss		
2000ml if 50kg **3200ml if 80kg**	Rapid, weak pulse (> 140 bpm) or bradycardia (< 60 bpm) Sever hypotension (< 70 mmHg) Pallor, cold clammy skin, peripheral cyanosis Air hunger Anuria Confusion or unconsciousness, collapse	Severe

PROUD to care

NHS
Barnsley Hospital
NHS Foundation Trust

Appendix 2

MOH Protocol

MAJOR OBSTETRIC HAEMORRHAGE

Definition: **APH** ⇨ Blood loss ≥ 1000mls; **PPH** ⇨ Blood loss ≥ 1500mls; **OR** ongoing severe bleeding >150mls/min & clinical shock

ACTION ☛: ACTIVATE MAJOR HAEMORRHAGE PROTOCOL

STOP THE BLEEDING

OBSTETRIC HAEMORRHAGE CONTROL

Severe APH - deliver baby

Severe PPH - (see below)

- Manage source of bleeding
- Rub up a contraction
- Repeat Syntocinon
- Consider Ergometrine IM
- Give bi-manual compression
- Commence IVI Syntocinon
- Consider rectal Misporostol / Haemobate
- Consider Tranexamic acid (1g bolus followed by 1g IV infusion over 8 hours)
- If still bleeding – transfer to theatre for surgical interventions.
- For patients on anticoagulants, seek advice from Consultant Haematologist. PCCs may be required

THROMBOPROPHYLAXIS

- Should be considered when patient is stable

KEY

Hb	Haemoglobin
FBC	Full Blood Count
PT	Prothrombin
APTT	Activated Partial Thromboplastin time
PCC	Prothrombin Complex Concentrate
U&E	Urea & Electrolytes
Ca2+	Total Calcium
RBCs	Red Blood Cells
FFP	Fresh Frozen Plasma
MHP	Major Haemorrhage Pack
G&S	Group and Save
Cryo	Pooled Cryoprecipitate

Most senior clinician in charge (or designated individual) to contact Blood Bank using the phrase:

"I would like to activate the Major Haemorrhage Protocol".

Blood Bank Contact details

Weekdays **08:45-17:15** Contact Blood Bank on ☎Ext **6181** or alternative Ext **1798/2628/Bleep 205**; or during out of hours (**17:15-08:45**) and **weekends** contact ☎Ext **6181 (alternative Bleep 205**

It is essential that you provide the Blood Bank with the following

Information Checklist

- ✔ Clinician in charge (in addition to your own name)
- ✔ Location of MH event
- ✔ Direct contact details
- ✔ Full patient demographics
- ✔ Confirmation that G&S sample has been taken.

Please note a Consultant Haematologist is NOT required to activate protocol

ACTION ☛: Take bloods and send to the lab (as a minimum): G&S (Blue top), FBC (Red Top), Coagulation Screen (Green Top), U&E, Ca^{2+} (Brown Top)

ACTION ☛: Order MH Pack 1, Collect components as available

MHP 1 comprises: 4 x RBCs & 4 x FFP

Please note that Emergency O RhD Negative or Group Specific red cells may be issued dependent on the status of the G&S sample

Please note: Order Cryoprecipitate if Fibrinogen <2g/L

Give MHP 1 and continue as required

REASSESS – PROCEED OR STAND DOWN

If suspected continuing haemorrhage requiring further transfusion, take repeat bloods as shown below

ACTION ☛: Take bloods below & send to the lab: FBC (Red Top), Coagulation Screen (Green Top), U&E, Ca^{2+} (Brown Top)

ACTION ☛: Order MH Pack 2, Collect components as available

MHP 2 comprises: 4 x RBCs, 4 x FFP, 1 x Platelet, 2 x Cryo

Give MHP 2 and continue as required

STAND DOWN

- Inform Blood Bank & Return **ALL** unused components **ASAP**.
- Complete traceability documentation and local audit proforma
- Take repeat bloods

RESUSCITATE

- Airway
- Breathing
- Circulation

AIMS FOR THERAPY

Hb	70-90g/l
Platelets	>75 x 10^9/l
PT ratio	<1.5 x upper limit of normal range
APTT ratio	<1.5 x upper limit of normal range
Fibrinogen	>2.0g/l
Total Calcium	>1.8mmol/l
Temperature	>36°C
Monitor for Hyperkalaemia	

PREVENT HYPOTHERMIA

- Use fluid warming device where appropriate
- Use forced air warming blanket

RESULTS REVIEW

FBC, Coagulation Screen – for abnormal results or if advice required, contact Consultant Haematologist via switchboard

REVIEW

All MH events are audited by the Transfusion Team and discussed as part of Pathology Governance. Please be prepared to assist with audit data collection and review.

AVAILABILITY OF BLOOD AND BLOOD COMPONENTS

Emergency O RhD Negative Red Cells	5 minutes
Group Specific Red Cells	20 minutes
Cross Matched Red Cells	45 minutes*
*potentially 60-90 minutes if patient not previously tested	
FFP/Octaplas (minimum thawing time)	30 minutes
Cryoprecipitate (minimum thawing time)	30 minutes
Platelets (order and delivery time)	1hr 30 minutes
Location of Emergency O RhD Negative Red cells	4 units in Blood Bank[$]
[$]-Only take 2 units at a time until Group Specific blood is available	

ATYPICAL RED CELL ANTIBODIES

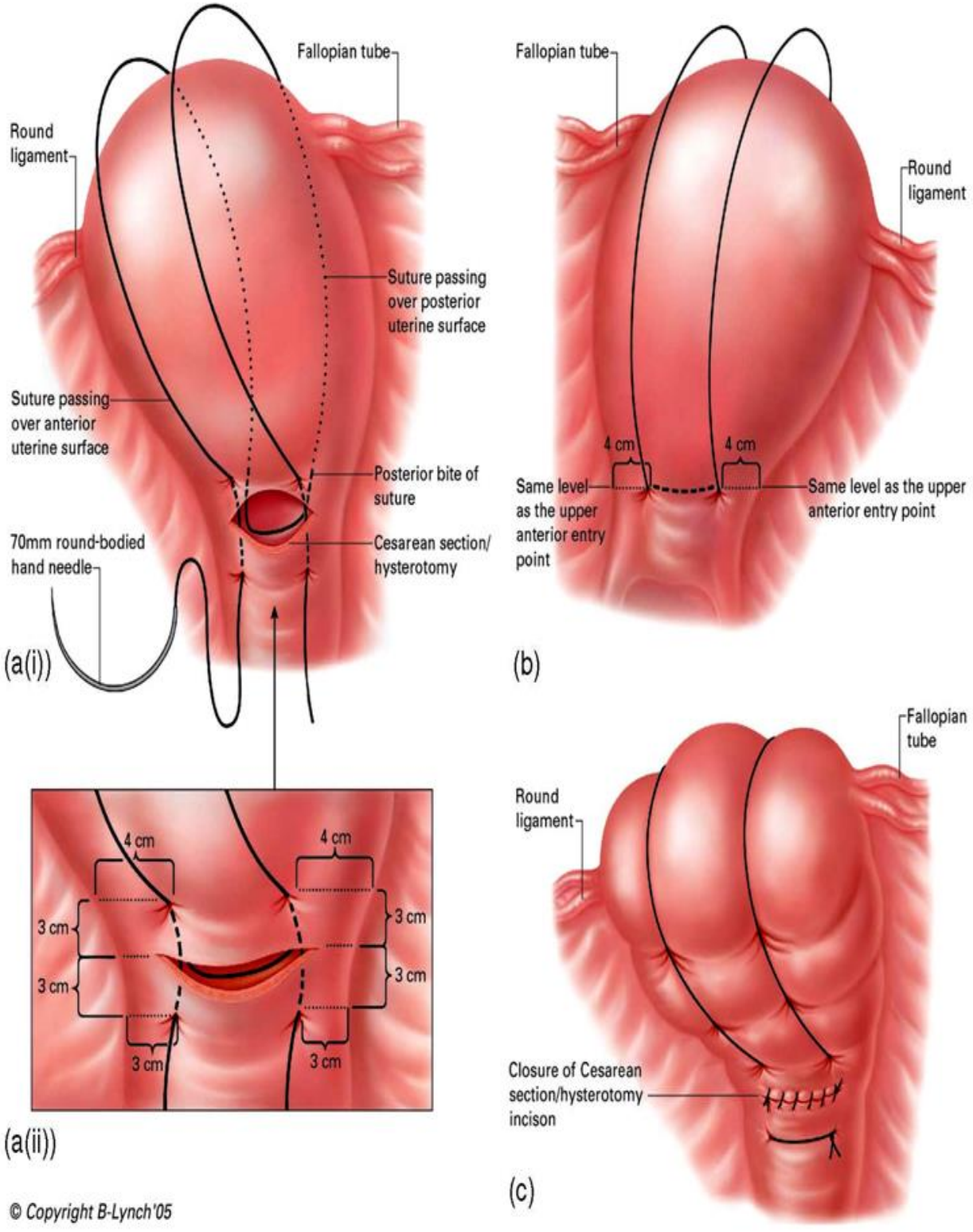
Please note that in the event of detection or previous history of atypical red cell antibodies, provision of suitable red cell components may take longer than stated. Please discuss with Consultant Haematologist ASAP.

2nd GROUP CHECK SAMPLE

For **ALL** patients **NOT** previously tested at Barnsley NHS Trust, a 2nd Group check sample will be required prior to the issue of group compatible Red Cells (from August 2017). Group O Red Cells will be issued until a suitable sample is received. Please discuss with the laboratory.

Appendix 3

B-Lynch Suture diagram



Appendix 4

Transfusion products that aid coagulation

Coagulation product	Comments
Fresh frozen plasma (FFP)	Liquid portion of whole blood. Contains labile as was as stabile coagulation products. Not a good source of fibrinogen. FFP at dose of 12-15 ml/kg should be considered for every 6 units of red cells during major haemorrhage. Requires thawing (20 – 30 minutes).
Cryoprecipitate	More concentrated source of fibrinogen than FFP. Administered at a standard dose of two 5-unit pools early in major obstetric haemorrhage. Requires thawing (20 – 30 minutes).
Fibrinogen concentrate	Critical protein for haemostasis and clot formation. Not licensed for use in haemorrhage in the UK. Needs reconstituting with water.
Platelet transfusion	To be used when platelet count is low. A platelet transfusion trigger of 75 x 10^9/L is recommended during active bleeding.
Tranexamic acid (TXA)	Decreased blood loss by preventing the breakdown of fibrin and maintaining blood clots. TXA should be employed early during major haemorrhage.

Appendix 5

Glossary of terms

APH- Antepartum Haemorrhage
BBC- Barnsley Birthing Centre
BMI- Body Mass Index
BP- Blood Pressure
CTG- Cardiotocography
CVP-Central Venous Pressure
FBC- Full Blood Count
FFP- Fresh Frozen Plasma
FHR- Fetal Heart Rate
G&S- Group and Save
ICU- Intensive Care Unit
IU- International Units
IUFD- Intrauterine Fetal Death
IV- Intravenous
LFT- Liver Function Test
MOEWS- Modified Obstetric Early Warning Score
MOH- Major Obstetric Haemorrhage
ODP- Operating Department Practitioner
PPH- Postpartum Haemorrhage
U&Es- Urea and Electrolytes
VTE- Venous Thromboembolism

Appendix 6 (must always be the last appendix)

Maintain a record of the document history, reviews and key changes made (including versions and dates)

Version	Date	Comments	Author

Review Process Prior to Ratification:

Name of Group/Department/Committee	Date
Reviewed by Maternity Guideline Group	N/A
Reviewed at Women's Business and Governance meeting	17/03/2023
Approved by CBU 3 Overarching Governance Meeting	22/03/223
Approved at Trust Clinical Guidelines Group	N/A
Approved at Medicines Management Committee (if document relates to medicines)	N/A

Trust Approved Documents (policies, clinical guidelines and procedures)

Approval Form

Please complete the following information and attach to your document when submitting a policy, clinical guideline or procedure for approval.

Document type (policy, clinical guideline or procedure)	Guideline
Document title	**Guideline for the Management of Obstetric Haemorrhage**
Document author (Job title and team)	Consultant Obstetrician/Speciality Registrar/ Midwife/Practice Educator Midwife/Hospital Transfusion Practitioners
New or reviewed document	Reviewed- Replaces Major Haemorrhage Algorithm Obstetric
List staff groups/departments consulted with during document development	Consultant Obstetrician/Speciality Registrar/ Midwife/Practice Educator Midwife/Hospital Transfusion Practitioners
Approval recommended by (meeting and dates):	Reviewed at Women's Business and Governance meeting 17/03/2023 Approved by CBU 3 Overarching Governance Meeting 22/03/2023
Date of next review (maximum 3 years)	23/03/2026
Key words for search criteria on intranet (max 10 words)	PPH, APH
Key messages for staff (consider changes from previous versions and any impact on patient safety)	
I confirm that this is the FINAL version of this document	**Name: Jade Carritt** **Designation: Governance Midwife**

FOR COMPLETION BY THE CLINICAL GOVERNANCE TEAM

Approved by (group/committee): CBU Governance
Date approved: 22/03/2026
Date Clinical Governance Administrator informed of approval: 23/03/2023
Date uploaded to Trust Approved Documents page: 28/03/2023