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Postpartum Haemorrhage Management Guideline

Summary statement: How does the document support patient care?	The purpose of this guideline is to provide good practice guidelines for staff involved in the management of postpartum haemorrhage.
Staff/stakeholders involved in development:	Obstetric anaesthetists, obstetric consultants and senior midwifery staff.
Division:	Women and Children's
Department:	Maternity
Responsible Person:	Chief of Service
Author:	Consultant Obstetrician
For use by:	All staff involved in the management of postpartum haemorrhage.
Purpose:	To provide evidence based guidance on postpartum haemorrhage.
This document supports:	RCOG Green top guideline 52 (2016) Prevention and Management of Postpartum Haemorrhage. MBRRACE report 2017. NICE (2017) Intrapartum care CG190. NICE 2019. NG121 Intrapartum care for women with existing medical conditions or obstetric complications and their babies
Key related documents:	**UH Sussex (SRH&WH) Maternity Guidelines**: CG1148 Recognition and Management of Severely Ill Pregnant Women , CG12030 Caesarean section birth , CG11103 Recovery post regional and GA anaesthesia , CG1112 Management of severe pre-eclampsia & eclampsia , CG1149 Shoulder dystocia , CG1139 Obesity , CG1146 Retained placenta , CG12004 APH intrapartum haemorrhage , CG1131 Perineal trauma and repair , CG12025 Anaemia in pregnancy , CG21009 Maternity fluid management as an in-patient or in labour guideline, CG1151 Uterine rupture **Trust Guidelines**: Management of Massive Blood Loss, Policy for the Provision of Intraoperative Cell Salvage, Management of Patients who Refuse a Blood Transfusion.
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Version	Date	Author	Status	Comment
1.0	July 2010	Consultant obstetrician	Archived	New Trust Wide Guideline
2.0	February 2011	Lead CNST midwife	Archived	Administrative update
4.0	July 2012	Obstetric, Anaesthetic and Haematology Consultants, Senior Midwives	Archived	Amendments made with regard to emergency calls and new flow chart
4.1	August 2013	Multidisciplinary team	Archived	Guideline updated following Major Obstetric Haemorrhage Meeting
5.0	February 2019	Consultant obstetrician and JOGG	Archived	Guideline updated in line with National Guidance (RCOG). Haemorrhage definitions change.
5.1	May 2019	Clinical Effectiveness Midwife	Archived	Updated appendix 6 following introduction of Maternity Local Safety Standard for procedural counts policy
5.2	February 2021	Clinical Effectiveness Support Midwife (Jo Collard)	Archived	Guideline amended in line with NG121 Intrapartum care for women with existing medical conditions or obstetric complications and their babies – Women/people with asthma not to be given carboprost to manage PPH.
5.3	October 2021	Clinical Effectiveness Support Midwife (Jo Collard)	LIVE	Added Appendix 7: Fluid therapy and blood product transfusion. Pronouns changed.

The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician.

If in doubt contact a senior colleague or expert.

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Postpartum Haemorrhage Management Guideline

1.0 Aim

The aim of this guideline is to provide evidence-based guidance on the management of women/people with postpartum haemorrhage, and ensure that their care is safe, effective and timely.

2.0 Scope

This guideline covers postpartum haemorrhage (PPH) and major obstetric haemorrhage (MOH).

3.0 Abbreviations

MEOWS - Maternity Early Observation Warning System	**RCOG -** Royal College of Obstetricians and Gynaecologist's
MOH - Major obstetric haemorrhage	**Hb -** Haemoglobin
CS - Caesarean section	**FBC -** Full blood count
IM - Intramuscular	**FFP -** Fresh Frozen Plasma
IV - Intravenous	**PPH -** Postpartum haemorrhage
ODP - Operating department practitioner	**ICS -** Intraoperative Cell Salvage
EBL - Estimated blood loss	**EUA -** Examination under anaesthesia
SHO - Senior house officer	

4.0 Responsibilities

This guideline applies to the following:

- Midwives
- Obstetricians
- Maternity assistants
- Obstetric anaesthetists and operating department practitioners
- Students (midwifery and medical)
- Blood transfusion personnel
- Haematology consultants
- Porters
- Clinical managers/matrons and all other relevant staff

This guideline will be reviewed as required in line with Trust and National recommendations and will be available via the Trust Intranet to ensure the guideline is accessible to all relevant staff.

5.0 Introduction

Postpartum haemorrhage remains one of the leading direct causes of maternal death in the UK, and early intervention and a team approach to caring for women experiencing PPH are vital if avoidable maternal deaths are to be prevented. Many cases reviewed in recent MBRRACE-UK reports are associated with poor communication and significantly substandard care.

Pregnant women/people must be asked at booking whether they would consent to receiving blood products. If the woman/person would not accept blood products, an appointment should be made to see an Obstetrician in the Antenatal Clinic. At this appointment, a management plan for labour should be made in accordance with the Trust policy on 'Refusal of Blood Products' and the details clearly documented in the antenatal record.

6.0 Definitions

6.1 PPH timing

- **Primary PPH** - blood loss of greater than 500mls within 24 hours of delivery.
- **Secondary PPH** – abnormal or excessive bleeding from the genital tract between 24 hours and 12 weeks postnatally.

6.2 Volume

- **PPH** – blood loss greater than 500mls.
- **Minor PPH** – blood loss 500-1000mls without clinical shock.
- **Major obstetric haemorrhage (MOH)** - blood loss greater than 1000mls and continuing to bleed or clinical shock.
- **Moderate MOH** - blood loss of 1000-2000mls.
- **Severe MOH** – blood loss greater than 2000mls.

For women/people with a booking weight of less than 60kg, a smaller volume of blood loss may be clinically significant.

6.3 Estimation of loss

Clinicians should be aware that estimation of blood loss visually is highly inaccurate. Every effort should be made to weigh blood loss volume early in any haemorrhage and clinical signs and symptoms should be included in the assessment of PPH (see Appendix 6 for Blood Loss Estimation form).

Haemorrhage should be considered when classic signs of hypovolaemia are present (tachycardia and/or agitation and the late sign of hypotension) even in the absence of revealed bleeding (MBRRACE-UK 2017).

7.0 Prevention of PPH

7.1 Risk factors and prevention

- Risk factors may present antenatally or intrapartum; care plans must be modified as and when risk factors arise (see Appendix 1 for risk factors).
- Clinicians must be aware of risk factors for PPH and should take these into account when counselling women/people about place of birth.
- Women/people with known risk factors for PPH should be advised to give birth in a hospital with a blood bank on site.

7.2 Minimising risk – reducing blood loss at birth

- Antenatal anaemia should be investigated and treated as outlined in the 'Anaemia in pregnancy guideline'. CG12025 Anemia during pregnancy
- Prophylactic uterotonics should be offered routinely in management of the third stage of labour in all women/people as they reduce the risk of PPH.
- For women/people without risk factors for PPH giving birth vaginally oxytocin 10units intramuscularly is the agent of choice.
- Higher doses of oxytocin do not appear to reduce the risk of PPH.
- For women/people having a caesarean section, oxytocin 5 units by slow intravenous injection is used.
- Ergometrine/oxytocin (Syntometrine) may be used in the absence of hypertension in women/people at higher risk of PPH, as it reduces the risk of PPH, but it is associated with a five-fold increased risk of nausea, vomiting and hypertension.
- Clinicians should consider the use of intravenous tranexamic acid in addition to oxytocin at CS in women/people at increased risk of PPH.
- Active management of the third stage, including early clamping of the umbilical cord, uterotonics and controlled cord traction reduces the risk of PPH. However, delayed cord clamping for at least 2 minutes is beneficial to the newborn, with benefits extending into infancy. Therefore active management of the third stage including early cord clamping is no longer recommended unless the woman/person is bleeding or at significant risk of bleeding.
- For active management of 3rd stage in vaginal births, oxytocin 10 units IM should be given with the birth of the anterior shoulder, or immediately after the birth of the baby and before the cord is clamped and cut (NICE 2017).
- There is some evidence that intravenous oxytocin 10 units is more effective than intramuscular oxytocin at reducing PPH, without increasing side effects (Adnan et al, 2018). The intravenous route should be considered in any woman/person who already has intravenous access.

7.3 Prostaglandins in the prevention of PPH

- Neither carboprost nor misoprostol have been shown to be preferable to oxytocin/ergometrine in routine prophylaxis of PPH. However, carboprost is

contraindicated in women/people with asthma due to the risk of bronchospasm (NICE, NG121 2019).

- Oxytocin was found to be superior to misoprostol in prevention of PPH in a systematic review.

7.4 Carbotocin

Carbotocin is a long acting oxytocin derivative, licensed for the prevention of PPH at caesarean. It reduces the need for further uterotonics, but there are no statistically significant differences between carbotocin and oxytocin in prevention of PPH.

7.5 Tranexamic Acid

- Reduces the risk of PPH greater than 1000mls in women/people having CS but not vaginal birth.
- The role of tranexamic acid in active bleeding is clear, but has not yet been established in prevention of bleeding.

8.0 Management of PPH

Clinicians should be prepared to use a combination of pharmacological, mechanical and surgical methods to stop bleeding in PPH. These methods should be based upon the causative factor(s).

Consider cause of bleeding – 'Four T's' to direct management (Appendix 1)

- Tone
- Tissue
- Trauma
- Thrombin

9.0 Communication and multi-disciplinary care

9.1 Communication with the woman/person

- Clear communication with the woman/person and their birthing partner is important, and clear information of what is happening should be given from the outset.

9.2 Communication with the multidisciplinary team

- It is important to be aware that PPH can easily progress to MOH and this is sometimes unrecognised, therefore early intervention and involvement of senior staff is essential.

To ensure good teamwork and communication, delegation of the following tasks during event should be clear:

- Who is leading the resuscitation? This may change as more staff arrive.
- Nominate a scribe to complete the proforma (appendix 3).
- Maintain running total of blood loss and fluid replacement – inform scribe.
- Monitoring vital signs and inform scribe.
- Nominate a member of staff to support family.
- Nominated liaison for blood transfusion.

Closed loop communication should be practiced in all emergency situations. For example, once the team leader has either requested information or asked for a procedure to be performed by a named person, they should then acknowledge the request explicitly and then state when it is done. This allows for clarification of requests if needed and avoids errors of omission. Closed-loop communication allows the sender to know that their requests have been heard and understood.

9.3 Emergency calls for PPH/MOH

9.3.1 Minor PPH - blood loss 500 ml -1000 ml and without clinical shock

- Call for help (emergency buzzer).
- Alert Obstetric team: **Dial 2222** and state '**Obstetric Emergency**' and location.

This will summon:

- Labour ward wo-ordinator.
- Obstetric registrar.
- Obstetric SHO.
- Obstetric anaesthetic registrar and operating department practitioner (ODP).
- Alerts the on call obstetric consultant (during normal working hours).

9.3.2 Major PPH - (EBL greater than 1000ml) or where there is evidence of haemodynamic instability

- **Dial 2222** and state **'Major Obstetric Haemorrhage'** (MOH).

The MOH Call includes all those above and will also alert:

- The nominated porter(s) who will go to blood transfusion.
- Blood transfusion.
- Obstetric consultant (by telephone out-of-hours via switchboard).

9.3.3 Severe Major Obstetric haemorrhage – blood loss greater than 2000mls

- **Dial 2222** and declare a '**Severe MOH'**.
- The switchboard operator will call the on call obstetric consultant to inform them.
- The consultant is expected to attend unless the blood loss has stopped.
- If there is ongoing bleeding, the consultant obstetrician should contact the consultant haematologist, and ensure that the consultant anaesthetist has been made aware of the situation.
- The RCOG recommends that the consultant obstetrician should attend when there is a blood loss of more than 1500ml where the haemorrhage is continuing.
- Following the '2222' MOH call, the Blood Transfusion Department should be contacted by a nominated liaison individual to give patient details, clinical situation and blood requirements.
- The management of PPH requires a multidisciplinary approach: the anaesthetist plays a crucial role in maintaining haemodynamic stability and if necessary, in determining and administering the most appropriate method of anaesthesia.
- The obstetric anaesthetic registrar is responsible for making the decision to inform the obstetric anaesthetic consultant once a MOH has been called and to liaise with the consultant anaesthetist regarding attendance and further anaesthetic support.
- In circumstances when it has been determined blood products are not required, the lead clinician (or nominated deputy) is responsible for informing Blood Transfusion. Blood transfusion personnel are then responsible for 'standing down' the porter(s).

Remember 2222 'Cardiac Arrest or Medical Emergency' calls can be used if indicated

9.3.4 Retrospective PPH diagnosis

In cases where a PPH is diagnosed retrospectively (e.g. following weighing of all the blood loss) and the patient is stable, the most senior clinician should assess the situation, document a plan and alert Blood Transfusion if blood products are required. It is not necessary to put out a 2222 call in this situation if woman/person is medically stable.

10.0 Assessment and resuscitation

- Shock is a late sign.
- Estimate blood loss and keep ongoing record - weigh swabs and pads.

10.1 Measures for Minor PPH - blood loss 500-1000mls without clinical shock

- IV access – one 14 gauge cannula.
- Bloods (20ml) for group and screen, FBC and coagulation including fibrinogen.
- Pulse, respiratory rate and blood pressure recorded every 15 minutes.
- Commence warmed crystalloid.

10.2 Measures for Major PPH – blood loss >1000ml & continuing to bleed or clinical shock

- Rapid evaluation: ABC – Airway, Breathing and Circulation.
- Lie patient flat.
- Insert two intravenous cannulae (14 gauge).
- Take blood for FBC, Clotting screen (including fibrinogen).
  - Urgent cross match (4 - 6 units).
  - Baseline renal and liver function.
- Give oxygen (O2) by mask at 10-15 L/min regardless of maternal oxygen concentration.
- Monitor blood pressure, pulse, respirations, O2 saturations, colour, cerebral function (AVPU) every 5 minutes – use oximeter, automated BP machine and cardiac monitor where available. Record on MEOWS or Patientrack.
- Record temperature every 15 minutes – use active warming (Bair-Hugger) if indicated.
- Catheterise if ongoing bleeding and monitor urine output, using an urometer and fluid balance chart. (See CG21009 Maternity fluid management as an in-patient or in labour guideline).
- Near patient testing for Hb – Hemacue or venous gas – is recommended which should be interpreted with caution with an acute bleed.
- Central venous pressure and arterial line monitoring should be considered early, along with blood gases and acid base status.
- Transfuse blood as soon as possible if clinically required.
- Until blood available infuse up to 3.5 litres of warmed clear fluids, initially 2 litres of warmed isotonic crystalloid. Further fluid resuscitation can continue with additional isotonic crystalloid or colloid (succinylinated gelatin). Hydroxyethyl starch should not be used.
- The best equipment available should be used to achieve rapid warmed infusion of fluids - rapid infusers are available on each site and should be kept on the labour ward for this eventuality.
- Special blood filters should not be used as they slow infusions.
- See appendix 2 for flow chart and appendix 3 for proforma.

10.3 Stop bleeding

10.3.1 Tone

The following mechanical and pharmacological measures should be instituted /administered in turn:

- Massage uterus firmly - rub up contraction and expel any clots.
- Remember to empty bladder.
- Oxytocin 5-10 units intravenously (slow IV injection) may have a repeat dose.

- Ergometrine 0.5 mg IM or IV (slow IV injection). Ergometrine is contra-indicated in women/people with hypertension.
- Oxytocin (40 units in 500mls 0.9% sodium chloride at 125 mls/hr).
- Syntometrine™ 1 ml IM (if not hypertensive) is an alternative but is not mentioned in the RCOG guideline.
- Carboprost (Hemabate™) intramuscularly (IM) 0.25 milligrams (mg) every 15 mins to a maximum of 8 doses (contraindicated in women/people with asthma). Carboprost must never be given IV. It is not licensed to give carboprost by direct intramyometrial injection however this can be considered by a senior obstetrician.
- If significant atonic haemorrhage continues after a third dose of carboprost without significant improvement i.e. 30 minutes or more after the first dose was given the team should consider transfer to the operating theatre for an examination under anaesthesia, with an awareness for the impending need for a laparotomy or hysterectomy.
- Misoprostol 800 micrograms sublingually – recommendation from The World Health Organisation and International Federation of Gynaecology and Obstetrics. There is no evidence to support giving both carboprost and misoprostol concurrently, and the combination tends to cause significant side effects for the woman/person, with little or no evidence of benefit. Studies suggest that misoprostol takes 1-2.5 hours to increase uterine tone, and is no more effective than an oxytocin infusion (RCOG 2016).

10.3.2 Tissue

- Deliver placenta – check completeness.
- If retained placenta with PPH - urgent transfer to theatre for manual removal and administer syntocinon infusion after delivery of the placenta.
- Consider possibility of placenta accrete.
- Consider possibility of uterine inversion.

10.3.4 Trauma

- Apply pressure as initial measure.
- Stabilise the mother.
- Repair the tear/episiotomy as soon as possible (transfer to theatre may be required).
- Regularly check the estimated blood loss, and maternal condition, particularly suturing is taking longer than average.
- Remember document swab and instrument counts in all cases.

In cases where a vaginal pack is used:

- Vaginal packs should be moistened with sterile saline or aqueous lubricant gel only as chlorhexidine based products e.g. Hibitaine can cause severe localised skin damage.

To minimise the risk of inadvertent retention of the pack:

- Clearly document and ensure patient is aware of it.
- Ensure pack externally visible.
- Patient to remain on Labour Ward until pack removed.
- Presence of pack to be documented on Labour Ward board.
- Red wrist band to be applied, stating 'Vaginal Pack inserted'
- When pack removed this should be witnessed and signed by 2 members of staff.

10.3.5 Thrombin

- In the presence of no previously known clotting concerns, coagulopathy is a late sign in PPH.
- Consider whether the patient has taken aspirin, antidepressants (SSRI), low molecular weight heparin and document last dose on proforma.
- Check coagulation results.
- Liaise with haematology if abnormal results – **remember fibrinogen <2 is abnormal** in the obstetric patient.

11.0 Communication with blood transfusion service

- Liaise with blood transfusion early.
- A standard form of words should be used to request blood from the laboratory – agreed between the laboratory and maternity staff and shared with all new members of staff – it should always be clear what timescale is expected.
- Cross matching vs electronic issue of blood – the laboratory uses automated testing for blood group and antibodies and in the absence of any significant antibodies can immediately supply ABO and RhD compatible blood, as long as the woman/person has been adequately tested in pregnancy and identified to the laboratory.
- The terms – **'controlled major obstetric haemorrhage and ongoing major obstetric haemorrhage'** may be helpful in defining the urgency of the situation.
- If clinically significant red cell antibodies are present, close liaison with the transfusion laboratory and consultant haematologist is essential to avoid delay in transfusion in life threatening haemorrhage.
- Cytomegalovirus (CMV) status – for elective transfusion in the antenatal period CMV negative blood is selected. In a PPH or antenatal emergency, standard leucocyte depleted blood or blood products should be given.
- There are no firm criteria for initiating red cell transfusion. The decision to provide blood transfusion should be based on both clinical and haematological assessment. In non-urgent situations, women/people should be given the Trust blood transfusion leaflet.
- Blood transfusion is almost always needed when the Hb is less than 60 g/l and rarely needed if the Hb is greater than 100g/l. However, blood results are not

available immediately and in a rapidly changing situation near patient testing can give misleading results. Serial measurements should be done if the clinical picture is unclear.

- Patients with acute haemorrhage can have a normal haemoglobin and clinical evaluation in this situation is therefore extremely important. Between 2009 and 2012 there were at least 3 maternal deaths where an acute point of care Hb measurement result is thought to have falsely reassured staff.
- If clinical condition warrants i.e. bleeding very heavy with or without maternal compromise, consider O Rh-negative (and K-negative) blood, although group-specific blood is preferable and usually available within 15 minutes.
- For women/people booking late and those unbooked, a second sample of blood must be sent to the lab if requested for cross-check. This will not delay the issuing of O negative blood in an emergency.
- All maternity units maintain a supply of group O Rhesus D-negative blood.
- If clinically significant red cell antibodies are present, close liaison with the transfusion laboratory is essential to avoid delay in transfusion in life-threatening haemorrhage. If identified antenatally, a group and save sample should be sent on admission in labour and the laboratory technician informed of the clinical situation.
- Record blood products given using correct documentation and ensure traceability tags are returned to blood transfusion.
- Guidelines from the European Society of Anesthesiology recommend that repeated measurements of serum lactate and base deficit together with haematocrit and Hb are made during haemorrhage and resuscitation to assess tissue perfusion and oxygenation.
- The use of additional blood products such as **Fresh Frozen Plasma (FFP)**, platelets and cryoprecipitate should be discussed with the consultant haematologist. In cases of Massive Obstetric Haemorrhage the blood transfusion technician can release blood products at the request of the consultant obstetrician or anaesthetist.

11.1 RCOG use of additional blood products recommendations:

- **Fresh frozen plasma (FFP)** – if no clotting results are available and bleeding is continuing, then after 4 units of red blood cells, FFP should be infused at a dose of 12-15mg/kg until haemostatic test results are known.
- If no haemostatic tests are available, early FFP should be considered for conditions with a suspected coagulopathy such as placental abruption or amniotic fluid embolism, or where detection of PPH has been delayed.
- If prothrombin time/activated partial thromboplastin time is more than 1.5 times normal and haemorrhage is ongoing, volumes of FFP in excess of 15mls/kg are likely to be needed to correct the coagulopathy.
- Clinicians should be aware that these components must be requested as soon as the need for them is anticipated, as there will always be a short delay due to thawing.

- **Fibrinogen** – a plasma fibrinogen greater than 2g/l should be maintained during ongoing PPH. Cryoprecipitate should be used for fibrinogen replacement.
- **Platelets** – during PPH, platelets should be transfused when the platelet count is less than 75 x 10 9/l based on laboratory monitoring.
- **Tranexamic Acid** – Consider when blood loss greater than 1000ml. The dose is 1g intravenously over 5-10 minutes, a further 1g can be given after 30 minutes if continued bleeding or evidence of coagulopathy. Further doses are rarely required in obstetric haemorrhage, and evidence is limited, but may be considered at the discretion of the consultants involved. Tranexamic acid can also be applied locally via a pack in pelvis in selected cases, although evidence for this is lacking.
- **Factor VIIa** – Recombinant Factor VIIa is no longer considered useful in the acute management of major haemorrhage. The Consultant Haematologist will advise on whether its use should be considered in specific cases.
- **Prothrombin Complex Concentrate** (Beriplex) is only indicated in the correction of warfarin-induced bleeding, and as warfarin is very rarely used in obstetric care, specialist advice should be sought before use.
- Record strict fluid balance – input and output.
- Documentation of discussion and decisions in maternity record.
- See appendix 7: Fluid therapy and blood product transfusion.

12.0 Use of intraoperative cell salvage (ICS)

- ICS is recommended for all cases of Obstetric Haemorrhage where the anticipated blood loss is greater than 20% of the patient's estimated blood volume (in pregnancy approximately 100ml/kg) e.g. 1200ml PPH in a 60kg woman/person. Blood can be collected from the cell salvage suction or from swabs (see appendix 4 for swab washing procedure). Consider whether the woman/person should be transferred to main theatre.
- The Trust policy on ICS states that: 'Wherever possible the advantages and risks of ICS and allogeneic blood transfusion should be discussed with the patient prior to undergoing an obstetrical surgical procedure and documented in the clinical record. This should include patients with an anticipated blood loss of >1000mls e.g. placenta accreta, large uterine fibroids and other predictable causes of major obstetric haemorrhage'.
- The decision to employ ICS should be made by the operating obstetrician and anaesthetist based on clinical need. Staff must complete the required ICS training and competency assessment before using ICS.

13.0 Surgical measures

If pharmacological measures fail to control the haemorrhage, commence surgical haemostasis sooner rather than later. The following conservative surgical interventions may be attempted, depending on clinical circumstances and available expertise:

13.1 Examination under anaesthesia (EUA) in theatre

If the bleeding is not rapidly brought under control in the room, there should be early consideration of transfer to theatre for examination under anaesthetic (EUA), particularly to identify and manage uterine inversion, retained products or genital tract trauma. The choice of anaesthetic is the anaesthetist's decision. The obstetrician should clearly communicate the woman/person's current condition, EBL, risks of coagulopathy and procedures that are planned or may become necessary.

13.2 Intrauterine balloon tamponade

This is an appropriate first line 'surgical' intervention for most women/people where uterine atony is the only or main cause of haemorrhage. The intrauterine tamponade balloon catheter can be inserted into the uterus and filled up with sterile normal saline until the bleeding is controlled (maximum capacity 500mls). Remember to check expiry date on the balloon catheter and that the balloon is patent before insertion. It is important to continue a Syntocinon infusion to keep the uterus contracted around the balloon. The balloon should remain in situ for up to 24 hours before decompressing. In most cases, 4-6 hours of tamponade will be adequate to achieve haemostasis. The balloon should be removed in daylight hours with senior staff and theatres available, in case further intervention is necessary. Intravenous antibiotics are recommended as long as the balloon is in situ. Women/people should be advised to take clear fluids only while the balloon is in situ, because of the risk of return to theatre.

13.3 Haemostatic brace suturing

Such as using procedures described by B-Lynch or modified compression sutures - see appendix 5). A laminated diagram of the procedure is kept in the obstetric theatre along with the appropriate suture.

13.4 Aortic compression

A temporary, but effective measure, to allow time for resuscitation to catch up with volume replacement, and appropriate surgical support to arrive.

13.5 Stepwise uterine devascularisation

i) One uterine artery
ii) Both uterine arteries
iii) Low uterine arteries
iv) One ovarian artery
v) Both ovarian arteries

This was described in a series of 103 patients with intractable PPH not responding to medical management and was effective in all cases without the need for hysterectomy.

13.6 Internal iliac (hypogastric) arteries

A senior gynaecologist or vascular surgeon or general surgical consultant should be called early since this technique requires a high degree of surgical skill and training and may be associated with ureteric injury.

13.7 Selective arterial embolisation - Interventional Radiology

- Consider, depending on clinical situation and availability of interventional radiologist.
- There is an elective arrangement whereby consultant obstetricians can discuss the management of high risk cases; such as major placenta praevia, placenta accreta or previous major obstetric haemorrhage, with a Consultant Interventional Radiologist in the antenatal period.
- There is currently no formal arrangement for emergency cases. It is recommended that in normal working hours cases of severe major obstetric haemorrhage where interventional radiology would be helpful, can be discussed with a consultant interventional radiologist via switchboard as early as possible.

13.8 Hysterectomy

It is considered good practice to liaise with a second consultant obstetrician/gynaecologist if hysterectomy is considered, and a second consultant should be involved in most circumstances. A subtotal hysterectomy is usually recommended for peripartum hysterectomy. Consider hysterectomy sooner rather than later (especially in cases of placenta accreta or uterine rupture), or if the woman/person declines blood transfusion.

13.9 Ongoing management

Consideration should be given for the most appropriate place of care for women/people who have suffered a severe MOH. A multidisciplinary discussion should take place to advise whether the woman/person should be transferred to the general ITU or HDU or remain on the labour ward.

14.0 Management of secondary PPH

This is usually due to retained products of conception (RPOC) or infection.

- High vaginal and endo-cervical swabs should be taken and appropriate antimicrobial therapy started when endometritis is suspected.
- The diagnosis of retained products is clinical and an ultrasound scan is rarely helpful. Evacuation of the uterus is indicated if the bleeding is heavy or if the uterus is bulky with an open cervix. Intravenous antibiotics should be given prior to surgical evacuation, and the procedure should be supervised by a senior obstetrician due to the increased risk of perforation and the risk of subsequent Ashermann's syndrome (synechiae or intrauterine adhesions).

- If the clinical picture is consistent with endometritis and the bleeding is not heavy, commence oral antibiotics and review. Only if there are clinical signs of severe infection are intravenous (IV) antibiotics necessary. Discussion with a Microbiologist is suggested in this situation. Start a Sepsis Assessment Tool.
- In the case of repeated presentation in the postpartum period with abnormal bleeding, an obstetric registrar or consultant should review and an ultrasound scan should be considered even in the presence of a closed cervix to exclude RPOC. A pelvic ultrasound scan may help to exclude the presence of retained products of conception, although the diagnosis of retained products is unreliable. Trophoblastic disease should be considered.
- Rare but important causes of secondary PPH are post-traumatic uterine artery pseudoanuerysm and aterio-venous fistula. These can cause torrential haemorrhage, particularly at ERPC and are often managed most effectively by interventional radiology techniques. The RCOG guideline proposes that colour flow Doppler imaging should be included in the evaluation of the post-partum uterus to identify these, although there is no strong evidence to support its use.

15.0 Management of minor PPH at home births (500ml – 1000ml without clinical shock)

The following mechanical and pharmacological measures should be commenced.

- Massage uterus firmly - rub up contraction and expel any clots.
- Remember to empty bladder.
- Oxytocin 10 units IM, may have a repeat dose.
- Call 999 for immediate transfer to hospital if woman/person's condition deteriorates and/or bleeding does not cease.
- Low threshold for transfer to hospital. Inform Labour Ward Coordinator at earliest detection of PPH.
- Ergometrine 0.5 mg IM. Ergometrine is contra-indicated in women/people with hypertension.
- Syntometrine™ 1 ml IM (if not hypertensive) is an alternative.
- If bleeding continues perform bimanual compression.
- Low threshold for transfer to hospital. Inform Labour Ward Coordinator at earliest detection of PPH.
- Weigh blood loss for accuracy if possible in the home setting.
- Bloods (20ml) for group and screen, FBC and coagulation including fibrinogen sent urgently to lab. Consider last Hb.
- Pulse, respiratory rate and blood pressure recorded every 15 minutes until stable
- Consider need for IV access and IV fluids. Only cannulate if transfer is anticipated.
- Aim to return to the home within 4 hours and ensure family have contact details if concerned.

16.0 Aftercare

Accurate and timely documentation is essential.

It is important to complete the PPH proforma and EBL estimation tool and record the following:

- Staff in attendance and time they arrive.
- Sequence of events.
- Administration of different pharmacological agents, their timing and sequence.
- Time of surgical intervention where relevant.
- Condition of the mother throughout the different steps.
- Timing of the fluid and blood products given.
- Total EBL and time bleeding considered settled.
- Datix incident reporting form.

During and after a Severe MOH, one member of staff should be assigned to keep the partner/family informed until the obstetric consultant is available to see them. The woman/person should be offered as much information as they wish about what happened, as soon as she is well enough. An opportunity to discuss the events surrounding the obstetric haemorrhage should be offered to the woman/person and their birthing partner at a mutually convenient time.

The woman/person should be offered referral to the Birth Afterthoughts service and a consultant follow up appointment for 6-8 weeks, particularly if there are outstanding issues.

Consideration is required for the impact of a massive obstetric haemorrhage upon staff involved. The co-ordinator and consultant on call should facilitate a staff debriefing for those involved at the earliest opportunity following the event.

17.0 Staff training

The maternity service's expectations for staff training are evidenced in the maternity training needs analysis. All staff involved in maternity care should receive annual training in the management of obstetric emergencies, including PPH. Training for PPH should be multi-professional and include skills drills.

18.0 Risk management and patient safety

All cases of PPH involving a blood loss of greater than 1500ml are subject to a clinical incident review.

19.0 Audit & quality monitoring

Suggested audit points:

- Was the woman/person screened for antenatal anaemia?
- When antenatal anaemia was detected, was it appropriately managed?
- Was the woman/person risk assessed for factors for PPH when they presented in labour?
- Was the woman/person offered uterotonics for the third stage of labour?
- Appropriate documentation of management, especially with the timing of events for women/people who have had PPH? Was the PPH proforma completed for each incident?
- Notification to the risk management team of women/people with PPH involving a blood loss greater than1500 ml?
- Proportion of the multidisciplinary team who have undergone skills drills training in PPH.

References

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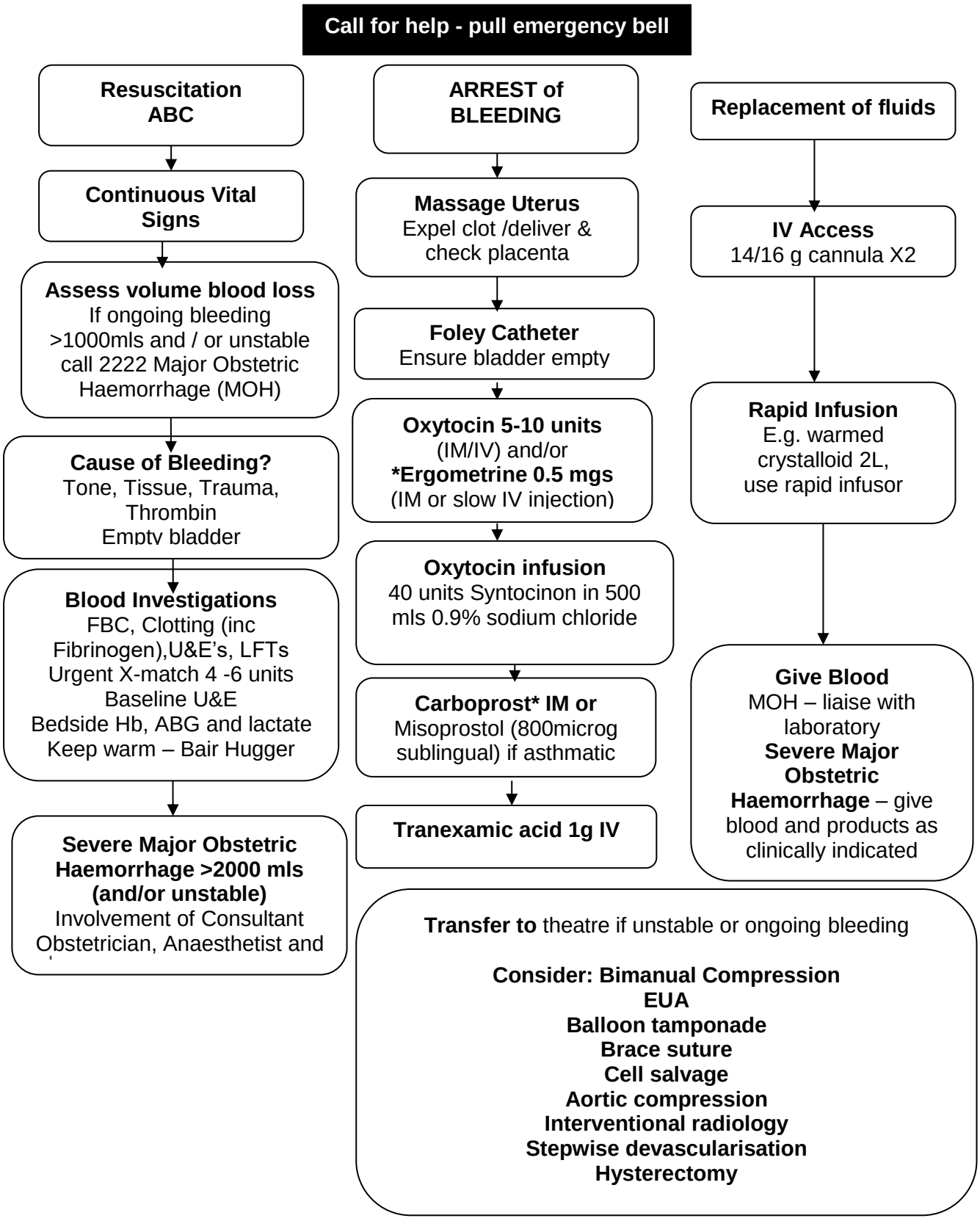
Appendix 1 PPH: Causes and risk factors

The four T's	Risk factors/notes
Tone: abnormalities of uterine contraction	
Uterine atonia	Physiological or prolonged 3rd stage, high parity
Overdistention of the uterus	Polyhydramnios, multiple gestation, macrosomia
Intra-amniotic infection	Fever, prolonged rupture of membranes
Functional/anatomical distortion of the uterus	Rapid labour, prolonged labour, fibroids, placenta praevia, uterine anomalies
Uterine relaxants e.g. magnesium, nifedipine	Terbutaline, GTN, anaesthetics
Bladder distention	May prevent uterine contraction
Tissue: retained products of conception	
Retained cotyledon or succenturiate lobe	Incomplete placenta at delivery
Retained blood clots	
Placenta accreta or percreta	Abnormal placenta on scan
Trauma: genital tract injury	
Lacerations of the cervix, vagina or perineum	Precipitate delivery, operative delivery
Extensions, lacerations at caesarean section	Malposition, deep engagement
Uterine rupture	Previous uterine surgery
Uterine inversion	High parity, excessive cord traction
Thrombin: abnormalities of coagulation	
Pre-existing states:	
Haemophilia A	History of hereditary coagulopathies or liver disease
Idiopathic thrombocytopenic purpura	Bruising
von Willebrand's disease	
History of previous PPH	
Acquired in pregnancy:	
Gestational thrombocytopenia	Bruising
Pre-eclampsia with thrombocytopenia	Raised blood pressure
Disseminated intravascular coagulopathy:	
PET/HELLP/AFLP	coagulopathy
Intrauterine fetal death	Fetal demise
Severe infection	Fever, neutrophilia/neutropenia
Abruption	Antepartum haemorrhage
Amniotic fluid embolus	Maternal collapse
Therapeutic anticoagulation	History of thromboembolic disease

Appendix 2: Management of Major Obstetric Haemorrhage



Appendix 3: PPH Proforma
(not to be printed from guideline)

Time Help Summoned
Western Sussex Hospitals NHS Foundation Trust
Emergency Bell:
2222 Obstetric Emergency :
2222 Major Obstetric Haemorrhage:
Massive Haemorrhage Event (>2000ml) liaison with Haematology Consultant: (via switchboard)

Postpartum Haemorrhage Proforma
DATE: START TIME:
USING MAIN WALL CLOCK

Booking weight < 60kg Y N

Please complete:

Unit No:.....
NHS No.:.....
NAME:.....

Assessment, Actions & Oxytocic Drugs

☐ Lie Flat ☐ Keep warm Give O2(10-15 L/min)
☐ Catheter ☐ Urometer ☐ Cannula: x1 ☐ x2

☐ Already in situ & patent ☐ Bloods: x-match ☐ ..... Units ☐ FBC ☐ Clotting

☐ **Tissue**
☐ Deliver Placenta ☐ Placenta already delivered
Placenta: complete /incomplete

☐ **Tone**	☐ Syntometrine 1ml IM *or* ☐ syntocinon 10 units IM **Time:**
☐ **Rub up contraction**	☐ Ergometrine 0.5mgs IM ☐ or slow IV inj **Time:**
☐ **Bimanual Compression**	☐ Syntocinon 5 units –slow IV inj **Time:**
	Syntocinon IVI 40units in 500mls N/saline @ 125ml/hr commenced at:
☐ **Other Drugs:**	Carboprost (Haemabate) IM 250mcgs ever 15 mins (max 8 doses, total 2mgs) time: 1- 2- 3- 4- 5- 6- 7- 8-
	☐ Misoprostol 800 mcgs PR Time:

☐ **Trauma**
☐ Perineal / cervical trauma check Suturing required: Y/N

☐ **Thrombin**
☐ Aspirin - Date/Time of last dose: ☐ LMWH Time of last dose:
☐ Anti-depressants ☐ Discussed with Haematologist
☐ Known clotting disorder ☐ Tranexamic Acid 1g IV
☐ Latest results checked

Running Blood Loss

Blood loss with times should be measured at regular intervals:

At 500mls and continuing call Obstetric Emergency

At 1000mls & ongoing bleeding call Major Obstetric Haemorrhage

At 2000mls, put out Severe Obstetric Haemorrhage Call & inform Consultant Obstetrician and Consultant Haematologist.
If Consultant Haematologist not contacted, please state reason: (Call 32049 SRH

Swabs in:	Swabs out:

Signature 1:

Signature 2:

IV Fluids given including blood products
Fluid Balance Chart commenced ☐
State fluids given and times:

Maternal Observations
(transfer to MEOWS Chart ASAP)

Time:	**Time:**
BP:	BP:
Pulse:	Pulse:
Resps:	Resps:
O2 sats:	O2 sats:

Haemacue time: **Result:**
Repeat haemacue time: **Result:**

TIME HAEMOSTASTS ACHIEVED:
Any antenatal blood loss: **mls**
Final Total Blood Loss: **mls**
Signature:
Print:

Appendix 3: PPH Proforma

(not to be printed from guideline)

Names and Grades of Staff involved in Postpartum Haemorrhage

Please complete or affix patient label
Unit No: ……
NHS No: ……..
Name: ……..

Date:
Name of Lead Clinician (most senior clinician):
Name of Liaison with Blood Transfusion:
Name of scribe:

Clinicians Present	Name	Arrival/contact time (if not already present)
Labour Ward Co-ordinator		
Midwives		
Obstetric Consultant(s)		
Obstetric Registrar		
Obstetric SHO		
Anaesthetic Consultant(s)		
Anaesthetic Registrar		
Anaesthetic ODP		
Maternity Care Assistant		
Scrub Nurse		
Clinicians contacted		
Blood Transfusion		
Porter(s)		

Appendix 4: Swab washing

Up to 50% of the total surgical blood loss may be contained within the surgical swabs, so swab washing will significantly improve the efficiency and yield of intra operative cell salvage (ICS).

Procedure:

1. Set up a sterile bowl with 1000ml sterile 0.9% sodium chloride.
2. Weigh the swabs aseptically by placing them on sterile sheet on the weighing scales.
3. Immediately after weighing, place blood soiled swabs for a few minutes in the sterile bowl of saline and soak for a few minutes to extract the red cells.
4. Remove the swabs after gentle compression to express any residual solution.
5. At the end of the procedure aspirate the swab wash solution from the bowl into the cell salvage reservoir using the ICS suction.

Notes:

Avoid washing swabs contaminated with betadine or other substances contraindicated in cell salvage.

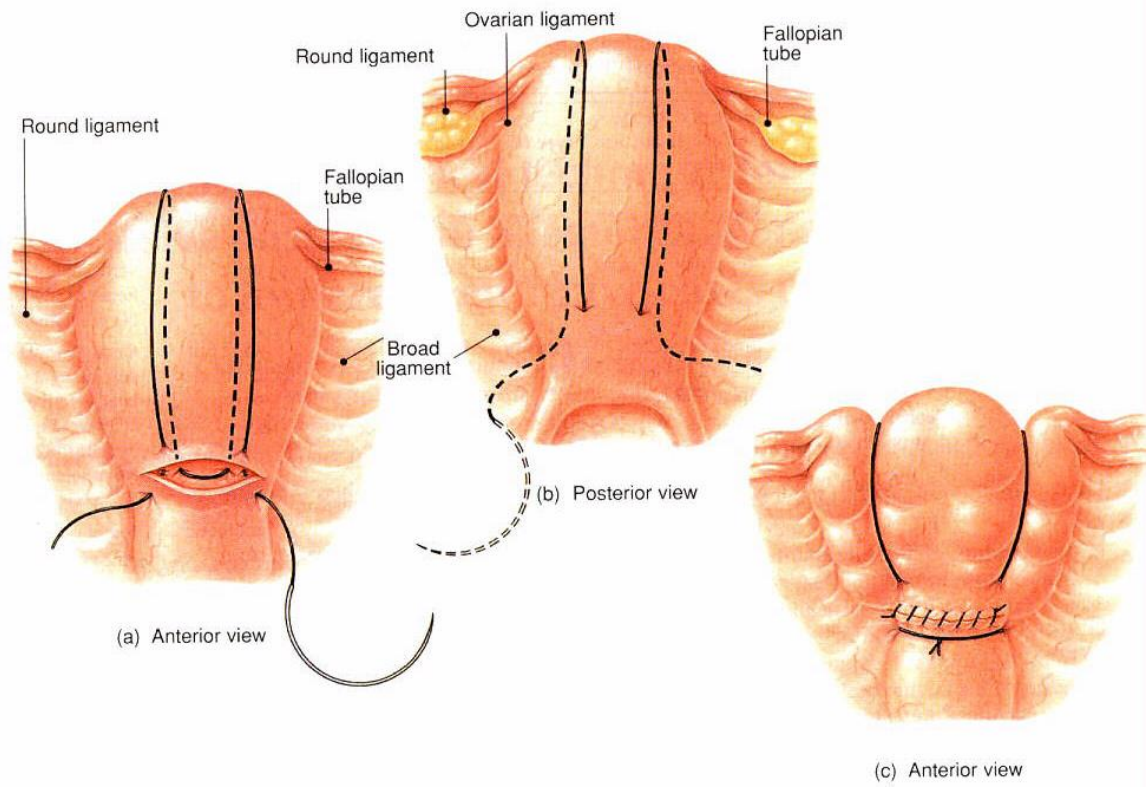
The swab wash should not be left for more than 6 hours without processing.

In cases of significant ongoing blood loss consider suction the swab washings into the Cell saver collection reservoir regularly and replenishing swab washing bowl with a further 1000ml sterile 0.9%sodium chloride before the end of the case.

References:

Better blood transfusion toolkit http://www.transfusionguidelines.org.uk UK Cell Salvage Action Group >technical factsheets>ICS in obstetrics

Appendix 5: B-Lynch Suture



The B-Lynch Suture is a brace-type suture that mimics the effect of bimanual compression. A stitch is passed through the anterior wall of the uterus at the level of the uterine incision, over the right cornu, horizontally through the lower posterior wall, over the left cornu, back through the anterior wall at the right side of the uterine incision and tied in front. A large needle and absorbable suture are required. A 48mm blunt tapercut needle with 1-Maxon is available in theatre).

If the uterus has not been opened, a modified technique can be used. If used with a tamponade balloon, insert the suture first, to reduce the risk of puncture to the balloon.

Appendix 6: Maternity Estimated Blood loss form

(not to be printed from guideline)

Maternity Estimated Blood Loss (EBL) Form

Date:	Time:	Obstetrician:	Anesthetist:	Midwife:

EBL from delivery:	Estimated Liquor volume:

Item type/ number	Dry weight	Wet weight	Weight of blood	Running total	Dry weights
					1g = 1ml
					10 x 7.5cms One = 4g Five = 20g
					22.5 x 22.5cms One = 12g Five =60g
					45 x 45cms [Theatre ONLY] One = 40g Five = 200g
					Inco = 30g
					ST = 14g
					Sheet = 620g
					Towel = 315g
					Gown = 250g

Total volume of cell saver returned:	Total Blood loss:	Swabs in situ on transfer to theatre:
Final total blood loss excluding liquor:		

EBL form completed by:

Print Name/Stamp: ..... Signature: ..... Designation: .....

Appendix 7: Fluid therapy and blood product transfusion

Crystalloid	Up to 2L isotonic crystalloid.
Colloid	Up to 1.5L 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.

Green Top Guideline No52. Prevention and Management of Postpartum Haemorrhage RCOG (2017)