Is there a role for recombinant factor VIIa (rFVIIa) therapy?

The routine use of rFVIIa is not recommended in the management of major PPH unless as part of a clinical trial. [*New 2016*] ✓

Monitoring and investigation in major PPH: what investigations should be performed and how should women be monitored?

Full protocol for monitoring and investigation in major PPH (blood loss greater than 1000 ml) and ongoing haemorrhage or clinical shock: D

- **immediate venepuncture (20 ml) for:**
  - **cross-match (4 units minimum)**
  - **full blood count**
  - **coagulation screen, including fibrinogen**
  - **renal and liver function for baseline**
- **monitor temperature every 15 minutes**
- **continuous pulse, blood pressure recording and respiratory rate (using oximeter, electrocardiogram and automated blood pressure recording)**
- **Foley catheter to monitor urine output**
- **two peripheral cannulae, 14 gauge**
- **consider arterial line monitoring (once appropriately experienced staff available for insertion)**
- **consider transfer to intensive therapy unit once the bleeding is controlled or monitoring at high dependency unit on delivery suite, if appropriate**
- **recording of parameters on a modified early obstetric warning score (MEOWS) chart (see Appendix IV)**
- **acting and escalating promptly when abnormal scores from a MEOWS chart are observed**
- **documentation of fluid balance, blood, blood products and procedures.**

What is the role of the anaesthetist in the management of PPH?

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. [*New 2016*] D

What methods should be employed to arrest the bleeding?

Clinicians should be prepared to use a combination of pharmacological, mechanical and surgical methods to arrest PPH. These methods should be directed towards the causative factor. [*New 2016*] D

What pharmacological and mechanical strategies can be used?

When uterine atony is perceived to be a cause of the bleeding, then a sequence of mechanical and pharmacological measures should be instituted in turn until the bleeding stops. ✓

What surgical treatments can be employed to arrest the bleeding?

If pharmacological measures fail to control the haemorrhage, surgical interventions should be initiated sooner rather than later. D

Intrauterine balloon tamponade is an appropriate first-line 'surgical' intervention for most women where uterine atony is the only or main cause of haemorrhage. C

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

It is recommended that a laminated diagram of the brace suture technique be kept in theatre. ✓

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

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

How should secondary PPH be managed?

In women presenting with secondary PPH, an assessment of vaginal microbiology should be performed (high vaginal and endocervical swabs) and appropriate use of antimicrobial therapy should be initiated when endometritis is suspected. [*New 2016*] D

A pelvic ultrasound may help to exclude the presence of retained products of conception, although the diagnosis of retained products is unreliable. [*New 2016*] C

Surgical evacuation of retained placental tissue should be undertaken or supervised by an experienced clinician. D

Risk management

Training and preparation: what measures can be taken to ensure optimal management of PPH?

Every maternity unit should have a multidisciplinary protocol for the management of PPH. [*New 2016*] ✓

All staff involved in maternity care should receive training in the management of obstetric emergencies, including the management of PPH. B

Training for PPH should be multiprofessional and include team rehearsals. [*New 2016*] B

All cases of PPH involving a blood loss of greater than 1500 ml should be the subject of a formal clinical incident review. D

Documentation

Accurate documentation of a delivery with PPH is essential. ✓

Debriefing

An opportunity to discuss the events surrounding the obstetric haemorrhage should be offered to the woman (possibly with her birthing partner/s) at a mutually convenient time. ✓

1. Purpose and scope

Primary postpartum haemorrhage (PPH) is the most common form of major obstetric haemorrhage. The traditional definition of primary PPH is the loss of 500 ml or more of blood from the genital tract within 24 hours of the birth of a baby.[2] PPH can be minor (500–1000 ml) or major (more than 1000 ml). Major can be further subdivided into moderate (1001–2000 ml) and severe (more than 2000 ml). In women with lower body mass (e.g. less than 60 kg), a lower level of blood loss may be clinically significant.[3] The recommendations in this guideline apply to women experiencing a primary PPH of 500 ml or more.

Secondary PPH is defined as abnormal or excessive bleeding from the birth canal between 24 hours and 12 weeks postnatally.[4] This guideline also includes recommendations specific to the management of secondary PPH.

Women with pre-existing bleeding disorders and women taking therapeutic anticoagulants are at increased risk of PPH; this guideline does not include specific recommendations for the management of such situations or for managing haemorrhage in women who refuse blood transfusion. Guidance on these topics is available from other sources.[5–8]

This guideline has been developed primarily for clinicians working in consultant-led obstetric units in the UK; recommendations may be less appropriate for other settings where facilities, resources and routine practices differ. There is increasing emphasis on the availability of births at home or in midwife-led units.[9] Obstetricians and midwives should develop guidelines for the management of obstetric emergencies that may occur in the community, including PPH. This is beyond the scope of this guideline.[10]

This guideline is restricted in scope to the management of PPH; the management of antepartum haemorrhage is the subject of the RCOG Green-top Guideline No. 63.[11] The prevention and management of PPH related to placenta praevia and placenta praevia accreta is addressed in Green-top Guideline No. 27,[12] while Green-top Guideline No. 47[13] provides guidance on the appropriate use of blood and blood products in obstetric practice.

2. Introduction and background epidemiology

Obstetric haemorrhage remains one of the major causes of maternal death in both developed and developing countries. The 2011–13 Confidential Enquiries into Maternal Deaths and Morbidity report[3] identified 13 direct deaths due to obstetric haemorrhage in the UK and Ireland; the report places obstetric haemorrhage as the second leading cause of direct maternal deaths. The recommendations from the report focus on basic clinical skills, with prompt recognition of the severity of a haemorrhage and emphasise communication and teamwork in the management of these cases. A systematic review[14] suggests that there may be regional variation in the prevalence of PPH. Standardisation of the measurement of PPH is recommended so that data from different regions are comparable.[15]

3. Identification and assessment of evidence

This guideline was developed in accordance with standard methodology for producing RCOG Green-top Guidelines. The Cochrane Library (including the Cochrane Database of Systematic Reviews and the Database of Abstracts of Reviews of Effects [DARE]), EMBASE, Trip, MEDLINE and PubMed (electronic databases) were searched for relevant randomised controlled trials, systematic reviews and meta-analyses. The search was restricted to articles published between 2007 and September 2015. The databases were searched using the relevant Medical Subject Headings (MeSH) terms, including all subheadings, and this was combined with a keyword search. Search words included 'postpartum h(a)emorrhage', 'factor VII', 'Syntocinon', 'carbetocin', 'carboprost', 'oxytocics', 'uterotonics', 'B-lynch suture', 'uterine artery embolism', 'bilateral internal iliac ligation', 'balloon, Rusch', 'Sengstaken catheters', 'thromboelastography', 'thromboelastometry', 'fibrinogen concentrate', 'point of care testing' and the search limited to humans and the English language. The National Library for Health and the National Guideline Clearinghouse were also searched for relevant guidelines and reviews. Guidelines and recommendations produced by organisations such as the British Committee for Standards in Haematology Transfusion Taskforce and national bodies were considered.

Where possible, recommendations are based on available evidence and the areas where evidence is lacking are annotated as 'good practice points'. Further information about the assessment of evidence and the grading of recommendations may be found in Appendix I.

4. Prediction and prevention of PPH

4.1 What are the risk factors for developing PPH and how can they be minimised?

4.1.1 Risk factors

Risk factors for PPH may present antenatally or intrapartum; care plans must be modified as and when risk factors arise. ✓

Clinicians must be aware of risk factors for PPH and should take these into account when counselling women about place of delivery. ✓

Women with known risk factors for PPH should only be delivered in a hospital with a blood bank on site. D

A number of case–control studies have identified antenatal and intrapartum risk factors for PPH (see Appendix II),[16–26] although most cases of PPH have no identifiable risk factors.[27] These risk factors have been summarised in a 2010 review.[28] Despite methodological limitations, these studies provide a guide to levels of risk, which can help clinicians in their discussions with women about setting for delivery (Table 1). The Confidential Enquiry into Maternal and Child Health[29] has recommended that women with known risk factors for PPH should not be delivered in a hospital without a blood bank on site.

Evidence level 4

The Society of Obstetricians and Gynaecologists of Canada has published a guideline on the prevention and management of PPH.[30] This summarises the causes of PPH as related to abnormalities of one or more of four basic processes – 'the four Ts': tone, trauma, tissue and thrombin. The most common cause of PPH is uterine atony.[27]

Table 1. Risk factors and the associated levels of risk for PPH

Risk factor	The four Ts	OR (95% CI)
Multiple pregnancy	Tone	3.30 (1.00–10.60)[16] 4.70 (2.40–9.10)[24]
Previous PPH	Tone	3.60 (1.20–10.20)[16]
Pre-eclampsia	Thrombin	5.00 (3.00–8.50)[16] 2.20 (1.30–3.70)[31]
Fetal macrosomia	Tone	2.11 (1.62–2.76)[20] 2.40 (1.90–2.90)[24]
Failure to progress in second stage	Tone	3.40 (2.40–4.70)[23] 1.90 (1.20–2.90)[31]
Prolonged third stage of labour	Tone	7.60 (4.20–13.50)[16] 2.61 (1.83–3.72)[20]
Retained placenta	Tissue	7.83 (3.78–16.22)[20] 3.50 (2.10–5.80)[23] 6.00 (3.50–10.40)[24]
Placenta accreta	Tissue	3.30 (1.70–6.40)[23]
Episiotomy	Trauma	4.70 (2.60–8.40)[16] 2.18 (1.68–2.76)[20] 1.70 (1.20–2.50)[24]
Perineal laceration	Trauma	1.40 (1.04–1.87)[20] 2.40 (2.00–2.80)[23] 1.70 (1.10–2.50)[24]
General anaesthesia	Tone	2.90 (1.90–4.50)[31]

4.1.2 Minimising risk – treating antenatal anaemia

Antenatal anaemia should be investigated and treated appropriately as this may reduce the morbidity associated with PPH. D

Guidelines from the National Institute for Health and Care Excellence (NICE)[32] recommend that pregnant women should be offered screening for anaemia. The British Committee for Standards in Haematology[33] has produced guidelines on the investigation and management of anaemia in pregnancy. Haemoglobin (Hb) levels outside the normal UK range for pregnancy (110 g/l at first contact and 105 g/l at 28 weeks) should be investigated and iron supplementation considered if indicated. It is recommended that parenteral iron therapy should be considered antenatally for women with iron deficiency anaemia who do not respond to oral iron.[10] Evidence level 4

A population-based study[34] has indicated an association between antenatal anaemia (Hb less than 90 g/l) and greater blood loss at delivery and postpartum. Evidence level 3