



**DISCLAIMER:** Results of database and or Internet searches are subject to the limitations of both the database(s) searched, and by your search request. It is the responsibility of the requestor to determine the accuracy, validity and interpretation of the results.

**Date of Search:** 18 Oct 2017

**Sources Searched:** Medline, Embase.

## Massive Obstetric Haemorrhage (Definition, Management and Outcomes)

---

[See full search strategy](#)

### 1. Is prophylactic tranexamic acid administration effective and safe for postpartum hemorrhage prevention? A systematic review and meta-analysis

**Author(s):** Li C.; Dong L.; Dai Z.; Gong Y.; Xie B.

**Source:** Medicine (United States); 2017; vol. 96 (no. 1)

**Publication Date:** 2017

**Publication Type(s):** Review

**PubMedID:** 28072700

Available at [Medicine \(United States\)](#) - from Europe PubMed Central - Open Access

**Abstract:**Background: To assess the efficacy and safety of tranexamic acid (TA) in reducing blood loss and lowering transfusion needs for patients undergoing caesarean section (CS) or vaginal delivery (VD). Methods: An electronic literature search of PubMed, EMBASE, OVID, Cochrane library, Scopus, Central, and Clinical trials.gov was performed to identify studies that evaluating the usage of TA in CS or VD. The methodological quality of included trials was assessed and data extraction was performed. Results: Finally, 25 articles with 4747 participants were included. Our findings indicated TA resulted in a reduced intra-, postoperative, and total blood loss by a mean volume of 141.25 mL (95% confidence interval [CI] -186.72 to -95.79,  $P < 0.00001$ ), 36.42mL (95% CI -46.50 to -26.34,  $P < 0.00001$ ), and 154.25mL (95% CI -182.04 to -126.47,  $P < 0.00001$ ) in CS. TA administration in VD was associated with a reduced intra-, postoperative, and total blood loss by a mean volume of 22.88 mL (95% CI -50.54 to 4.77,  $P = 0.10$ ), 41.24mL (95% CI -55.50 to -26.98,  $P < 0.00001$ ), and 84.79mL (95% CI -109.93 to -59.65,  $P < 0.00001$ ). In addition, TA could lower the occurrence rate of postpartum hemorrhage (PPH) and severe PPH, and reduce the risk of blood transfusions. No increased risk of deep vein thrombosis (DVT) after CS or VD was associated with TA usage, while the minor side effects were more common. Conclusions: Our findings indicated that intravenous TA for patients undergoing CS was effective and safe. Although prophylactic TA administration is associated with reduced PPH, current existing data are insufficient to draw definitive recommendations about its clinical significance due to the poor to moderate quality of the included literatures. Thus, high-quality randomized controlled trials with larger samples are needed to validate our findings. Copyright © 2017 the Author(s).

## **2. Efficacy of pelvic artery embolisation for severe postpartum hemorrhage**

**Author(s):** Spreu A.; Abgottspon F.; Baumann M.U.; Surbek D.; Kettenbach J.

**Source:** Archives of Gynecology and Obstetrics; Oct 2017 ; p. 1-8

**Publication Date:** Oct 2017

**Publication Type(s):** Article In Press

Available at [Archives of Gynecology and Obstetrics](#) - from SpringerLink

**Abstract:** Purpose: The purpose of our study was to evaluate the outcome of selective pelvic arterial embolisation (PAE) in women with severe postpartum hemorrhage (PPH). Methods: We performed a retrospective, controlled, single-center cohort study. A total of 16 consecutive women with PPH who underwent therapeutic PAE were included. As historical control group, we included 22 women with similar severity of PPH who were managed without PAE. Outcome measures included necessity of surgical interventions such as postpartum hysterectomy and laparotomy after vaginal delivery, the amount of red blood cell transfusions, and hematologic findings after the procedure. Results: PAE was successful in stopping PPH and preserving the uterus in all 16 women in the study group. No woman in the PAE group required a postpartum hysterectomy, whereas postpartum hysterectomy was unavoidable in two women in the control group. Laparotomy after vaginal delivery was necessary in two women of the group without embolisation. Hematologic parameters after the treatment were better in the PAE group than in the control group, although these differences were only in part statistically significant. There were no unwarranted effects of PAE identifiable in the study group. Conclusion: This is the first controlled study assessing the efficacy of PAE for the treatment of PPH. Our data suggest that PAE is effective for the treatment of severe PPH. In view of the lack of complications and unwarranted effects, clinical use of PAE in severe PPH seems justified, particularly in view of the life-threatening condition and the potential to preserve fertility in affected patients. Further evidence from well-designed prospective randomized-controlled trials would be nevertheless desirable in the future. Copyright © 2017 Springer-Verlag GmbH Germany

**Database:** EMBASE

### **3. Practice Bulletin No. 183: Postpartum Hemorrhage**

**Author(s):**

**Source:** Obstetrics and gynecology; Oct 2017; vol. 130 (no. 4)

**Publication Date:** Oct 2017

**Publication Type(s):** Article

**PubMedID:** 28937571

Available at [Obstetrics and gynecology](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:**Maternal hemorrhage, defined as a cumulative blood loss of greater than or equal to 1,000 mL or blood loss accompanied by signs or symptoms of hypovolemia within 24 hours after the birth process, remains the leading cause of maternal mortality worldwide (1). Additional important secondary sequelae from hemorrhage exist and include adult respiratory distress syndrome, shock, disseminated intravascular coagulation, acute renal failure, loss of fertility, and pituitary necrosis (Sheehan syndrome). Hemorrhage that leads to blood transfusion is the leading cause of severe maternal morbidity in the United States closely followed by disseminated intravascular coagulation (2). In the United States, the rate of postpartum hemorrhage increased 26% between 1994 and 2006 primarily because of increased rates of atony (3). In contrast, maternal mortality from postpartum obstetric hemorrhage has decreased since the late 1980s and accounted for slightly more than 10% of maternal mortalities (approximately 1.7 deaths per 100,000 live births) in 2009 (2, 4). This observed decrease in mortality is associated with increasing rates of transfusion and peripartum hysterectomy (2-4). The purpose of this Practice Bulletin is to discuss the risk factors for postpartum hemorrhage as well as its evaluation, prevention, and management. In addition, this document will encourage obstetrician-gynecologists and other obstetric care providers to play key roles in implementing standardized bundles of care (eg, policies, guidelines, and algorithms) for the management of postpartum hemorrhage.

**Database:** EMBASE

#### **4. An update on the risk factors for and management of obstetric haemorrhage**

**Author(s):** Sebghati M.; Chandraharan E.

**Source:** Women's Health; Aug 2017; vol. 13 (no. 2); p. 34-40

**Publication Date:** Aug 2017

**Publication Type(s):** Review

**Abstract:**Obstetric haemorrhage is associated with increased risk of serious maternal morbidity and mortality. Postpartum haemorrhage is the commonest form of obstetric haemorrhage, and worldwide, a woman dies due to massive postpartum haemorrhage approximately every 4 min. In addition, many experience serious morbidity such as multi-organ failure, complications of multiple blood transfusions, peripartum hysterectomy and unintended damage to pelvic organs, loss of fertility and psychological sequelae, including posttraumatic stress disorders. Anticipation of massive postpartum haemorrhage, prompt recognition of the cause and institution of timely and appropriate measures to control bleeding and replacement of the lost blood volume and restoration of oxygen carrying capacity (i.e. haemoglobin) and correction of the 'washout phenomenon' leading to coagulopathy will help save lives. Obstetric shock index may help in avoidance of underestimation of blood loss and the use of tranexamic acid, oxytocics and timely peripartum hysterectomy, if appropriate, will help save lives. Triple P procedure has been recently developed as the conservative surgical alternative for women with abnormal invasion of the placenta and has been shown to significantly reduce the blood loss and to reduce inpatient stay. Copyright © 2017, © The Author(s) 2017.

**Database:** EMBASE

#### **5. Management of post-partum haemorrhage**

**Author(s):** Ghosh M.; Chandraharan E.

**Source:** Obstetrics, Gynaecology and Reproductive Medicine; Aug 2017; vol. 27 (no. 8); p. 239-244

**Publication Date:** Aug 2017

**Publication Type(s):** Review

**Abstract:**The most recent Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) confidential enquiry into maternal deaths 2012-2014 states that for women in the United Kingdom, giving birth remains as safe as ever, with a maternal mortality rate of 1000 ml). Major can be further subdivided into moderate (1001-2000 ml) and severe (>2000 ml). Secondary PPH is defined as any abnormal bleeding or excessive bleeding from the birth canal between 24 hours and 12 weeks after delivery. Although, in some cases, massive obstetric haemorrhage can be anticipated, enabling steps to be taken for prevention and timely and effective management, it most often occurs in women who are classified as 'low risk', with no identified antenatal or intrapartum risk factors. A timely, systematic and multidisciplinary approach to restore the blood volume and clotting system whilst arresting bleeding, at the same time, should be the key cornerstones in the management of PPH. Such an approach would help further reduce maternal morbidity and mortality. Hence, all clinicians involved in antepartum and intrapartum care should have the necessary knowledge and skills to identify risk factors, signs and symptoms of massive PPH and should have adequate training in not only activating potentially life-saving emergency protocols but also in taking immediate steps to arrest ongoing bleeding. Copyright © 2017 Elsevier Ltd

**Database:** EMBASE

## **6. Impact of uterine balloon tamponade on the use of invasive procedures in severe postpartum hemorrhage.**

**Author(s):** Gauchotte, Emilie; De La Torre, Manuela; Perdriolle-Galet, Estelle; Lamy, Catherine; Gauchotte, Guillaume; Morel, Olivier

**Source:** Acta obstetrica et gynecologica Scandinavica; Jul 2017; vol. 96 (no. 7); p. 877-882

**Publication Date:** Jul 2017

**Publication Type(s):** Journal Article

**PubMedID:** 28295136

Available at [Acta obstetrica et gynecologica Scandinavica](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**INTRODUCTIONThe aim of this study was to assess the impact of tamponade when uterotonic agents fail, on the need for surgery or interventional radiology.MATERIAL AND METHODSAll women who received sulprostone for postpartum hemorrhage were retrospectively compared over two periods [December 2008 to December 2010 without use of tamponade (period 1) and June 2011 to June 2013 with use of tamponade (period 2)] in the case of sulprostone failure (STROBE compliant retrospective cohort study). During period 2, interventional radiology or surgery was used only in the case of tamponade failure.RESULTS165 women were included (74 for period 1, 91 for period 2). The rate of interventional radiology or surgery significantly decreased from period 1 (21 of 74 women, 28.4%) to period 2 (six of 91 women, 6.6%,  $p = 0.0003$ ). The rate of assumed failure of uterotonic agents was higher for period 2: 22 of 74 women (29.7%) during period 1, and 41 of 91 (45.1%,  $p = 0.0439$ ) during period 2. The success rate of tamponade was 92.1% (35 of 38 women).CONCLUSIONSAlthough the efficacy of tamponade should be viewed in the light of its widespread use, our findings confirm that tamponade significantly reduces the need for interventional radiology or surgery for postpartum hemorrhage treatment.

**Database:** Medline

## **7. Intrauterine balloon tamponade for management of severe postpartum haemorrhage in a perinatal network: a prospective cohort study**

**Author(s):** Revert M.; Rozenberg P.; Cottenet J.; Quantin C.; Raynal P.; Cibot E.

**Source:** BJOG: An International Journal of Obstetrics and Gynaecology; Jul 2017; vol. 124 (no. 8); p. 1255-1262

**Publication Date:** Jul 2017

**Publication Type(s):** Article

**Abstract:**Objective: To evaluate the effectiveness of intrauterine balloon tamponade (IUBT) for management of severe postpartum haemorrhage (PPH). To identify the factors predicting IUBT failure. Design: Prospective cohort study. Setting: Ten maternity units in a perinatal network. Population: Women treated by IUBT from July 2010 to March 2013. Methods: The global IUBT success rate was expressed as the number of women with severe PPH who were successfully treated by IUBT divided by the total number treated by IUBT. IUBT failure was defined as the need for arterial embolisation or surgery. Logistic regression analysis was used to estimate factors predicting IUBT failure. Main outcome measures: Global IUBT success rate. Factors associated with IUBT failure. Results: Intrauterine balloon tamponade was attempted in 226 women: 171 after vaginal delivery (VD) (75.7%) and 55 during or after caesarean delivery (CD) (24.3%). The global success rate was 83.2% (188/226) and was significantly higher after VD (152/171, 88.9%) than CD (36/55, 65.5%,  $P$  Copyright © 2016 Royal College of Obstetricians and Gynaecologists

**Database:** EMBASE

## **8. Prevention and Management of Postpartum Haemorrhage: Green-top Guideline No. 52.**

**Author(s):**

**Source:** BJOG : an international journal of obstetrics and gynaecology; Apr 2017; vol. 124 (no. 5); p. e106

**Publication Date:** Apr 2017

**Publication Type(s):** Journal Article

**PubMedID:** 27981719

**Database:** Medline

## **9. Managing major obstetric haemorrhage: Pharmacotherapy and transfusion.**

**Author(s):** Collis, Rachel; Guasch, Emilia

**Source:** Best practice & research. Clinical anaesthesiology; Mar 2017; vol. 31 (no. 1); p. 107-124

**Publication Date:** Mar 2017

**Publication Type(s):** Journal Article Review

**PubMedID:** 28625299

**Abstract:**Major obstetric haemorrhage is a leading cause of maternal mortality. A prescriptive approach to early recognition and management is critical to improving outcomes. Uterine atony is the primary cause of post-partum haemorrhage. First-line prevention and treatment include the administration of uterine tonic agents; other conservative measures include uterine cavity tamponade and uterine compression sutures. Interventional radiology procedures have been used for both prophylaxis and treatment, but a hysterectomy may be necessary if conservative measures fail. Assessment of anaemia and coagulation status is an important aspect of the management of haemorrhage. Hypofibrinogenaemia is a predictor of severe haemorrhage. Early and empiric use of fixed transfusion red blood cell:plasma:platelet ratios is controversial and may not be justified for all causes of haemorrhage. Cell salvage may be used safely in obstetric haemorrhage. Goal-directed therapy using point-of-care testing (e.g. thromboelastography) has not been well studied but holds promise for individualising resuscitation measures.

**Database:** Medline

## **10. Recent Advances in the Management of Major Postpartum Haemorrhage - A Review.**

**Author(s):** Rani, P Reddi; Begum, Jasmina

**Source:** Journal of clinical and diagnostic research : JCDR; Feb 2017; vol. 11 (no. 2); p. QE01

**Publication Date:** Feb 2017

**Publication Type(s):** Journal Article Review

**PubMedID:** 28384942

Available at [Journal of clinical and diagnostic research : JCDR](#) - from Europe PubMed Central - Open Access

**Abstract:**Postpartum haemorrhage (PPH) is a leading cause of maternal mortality and morbidity worldwide and 75-90% of these haemorrhage results from uterine atony. Delayed and substandard obstetrics care can kill a woman within hours of Major Obstetric Haemorrhage (MOH). Prenatal identification of at risk women, prompt assessment of blood loss, effective management and involvement of multidisciplinary teams is of utmost importance to save the lives of these women. However, even with the best prenatal care, PPH occurs, it can occur without any risk factors. The first step in management is achieving haemodynamic stability, second being arrest of bleeding, both are done simultaneously. Cases of refractory PPH is managed by postpartum hysterectomy which results in complete inability in hosting a future pregnancy, a psychological impact and risk of intra operative surgical morbidities. This review discusses the current evidence based management of PPH, existing controversies in transfusion of blood and blood products and newer advances in this field. It was conducted by searching the English language medical literature using Medline (1994-2015). The current scenario in developing countries mandates research on newer and practicable strategies to tackle PPH which can be implemented effectively and have an upper edge over the existing practices in the management of PPH.

**Database:** Medline

## **11. Massive obstetric hemorrhage: Current approach to management.**

**Author(s):** Guasch, E; Gilsanz, F

**Source:** Medicina intensiva; 2016; vol. 40 (no. 5); p. 298-310

**Publication Date:** 2016

**Publication Type(s):** Journal Article

**PubMedID:** 27184441

Available at [Medicina intensiva](#) - from Free Medical Journals . com

**Abstract:**Massive obstetric hemorrhage is a major cause of maternal mortality and morbidity worldwide. It is defined (among others) as the loss of >2,500ml of blood, and is associated to a need for admission to critical care and/or hysterectomy. The relative hemodilution and high cardiac output found in normal pregnancy allows substantial bleeding before a drop in hemoglobin and/or hematocrit can be identified. Some comorbidities associated with pregnancy can contribute to the occurrence of catastrophic bleeding with consumption coagulopathy, which makes the situation even worse. Optimization, preparation, rational use of resources and protocolization of actions are often useful to improve outcomes in patients with postpartum hemorrhage. Using massive obstetric hemorrhage protocols is useful for facilitating rapid transfusion if needed, and can also be cost-effective. If hypofibrinogenemia during the bleeding episode is identified, early fibrinogen administration can be very useful. Other coagulation factors in addition to fibrinogen may be necessary during postpartum hemorrhage replacement measures in order to effectively correct coagulopathy. A hysterectomy is recommended if the medical and surgical measures prove ineffective.

**Database:** Medline

**12. Treatment of Postpartum Hemorrhage With Blood Products in a Tertiary Hospital: Outcomes and Predictive Factors Associated With Severe Hemorrhage.**

**Author(s):** Guasch, Emilia; Gilsanz, Fernando

**Source:** Clinical and applied thrombosis/hemostasis : official journal of the International Academy of Clinical and Applied Thrombosis/Hemostasis; Oct 2016; vol. 22 (no. 7); p. 685-692

**Publication Date:** Oct 2016

**Publication Type(s):** Journal Article

**PubMedID:** 25712981

**Abstract:**Postpartum hemorrhage (PPH) remains a leading cause of maternal mortality and morbidity worldwide. This retrospective observational study describes patient characteristics and hemostatic therapies administered to 352 parturients experiencing PPH and analyzes risk factors for developing severe PPH. During the study period, bleeding was controlled in all cases and 99.4% survived. The majority (98%) of patients received packed red blood cells. The most frequent hemostatic therapies administered were fibrinogen concentrate (56%), fresh frozen plasma (49%), and platelets (30%). A total of 124 (35%) women experienced severe PPH. Significant independent predictors for evolution to severe PPH were age, obstetric comorbidity, and plasma fibrinogen concentration. The latter was based on records from 267 (76%) patients. Plasma fibrinogen concentration before labor was the only modifiable prepartum risk factor independently associated with severe PPH, indicating that fibrinogen monitoring is warranted in these patients.

**Database:** Medline



### **13. Endovascular management of massive post-partum haemorrhage in abnormal placental implantation deliveries.**

**Author(s):** Rebonato, Alberto; Mosca, Stefano; Fischer, Matthias; Gerli, Sandro; Orgera, Gianluigi; Graziosi, Luigina; Maiettini, Daniele; Di Renzo, Gian Carlo; Epicoco, Giorgio; Krokidis, Miltiadis; Rossi, Michele; Scialpi, Michele

**Source:** European radiology; Jun 2016; vol. 26 (no. 6); p. 1620-1630

**Publication Date:** Jun 2016

**Publication Type(s):** Journal Article

**PubMedID:** 26373762

Available at [European radiology](#) - from SpringerLink

Available at [European radiology](#) - from EBSCO (CINAHL with Full Text)

Available at [European radiology](#) - from ProQuest (Hospital Premium Collection) - NHS Version

**Abstract:**OBJECTIVE To retrospectively evaluate safety and efficacy of pelvic artery embolisation (PAE) in post-partum haemorrhage (PPH) in abnormal placental implantation (API) deliveries. METHODS From January 2009 to November 2013, 12 patients with API and intractable intraoperative PPH underwent PAE after caesarean delivery to control a haemorrhage (in four of these cases after hysterectomy). Arterial access was obtained prior to the delivery; PAE was performed in the obstetrics operating room by an interventional radiologist that was present with an interventional radiology (IR) team during the delivery. RESULT PAE was successful in preventing bleeding and avoid hysterectomy in four cases (group A). Uterine atony and disseminated intravascular coagulation caused failure of PAE requiring hysterectomy in four patients (group B). PAE prevented bleeding post-hysterectomy in the remaining four cases (group C). Technical success (cessation of contrast extravasation on angiography or occlusion of the selected artery) was 100 %. Maternal and foetal mortality and morbidity were 0 %. CONCLUSION PAE is a minimal invasive technique that may help to prevent hysterectomy and control PPH in API pregnancies without complications. Embolisation should be performed on an emergency basis. For such cases, an IR team on standby in the obstetrics theatre may be useful to prevent hysterectomy, blood loss and limit morbidity. KEY POINTS • Endovascular treatment is a validated technique in post-partum haemorrhage. • Abnormal placental implantation is a risk factor for post-partum haemorrhage. • We propose an interventional radiologist standby in the delivery room.

**Database:** Medline

**14. Caring for pregnant women for whom transfusion is not an option. A national review to assist in patient care**

**Author(s):** Kidson-Gerber G.; Kerridge I.; Farmer S.; Stewart C.L.; Savoia H.; Challis D.

**Source:** Australian and New Zealand Journal of Obstetrics and Gynaecology; Apr 2016; vol. 56 (no. 2); p. 127-136

**Publication Date:** Apr 2016

**Publication Type(s):** Review

**PubMedID:** 26572504

Available at [Australian and New Zealand Journal of Obstetrics and Gynaecology](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**Postpartum haemorrhage (PPH) is the leading cause of maternal mortality and morbidity globally. Obstetric bleeding can be catastrophic and management is challenging, involving a coordinated multidisciplinary approach, which may include blood products. In settings where blood transfusion is not an option, either because of patient refusal (most commonly in Jehovah Witnesses) or because of unavailability of blood, management becomes even more challenging. Observational studies have demonstrated an association between refusal of blood products in major obstetric haemorrhage and increased morbidity and mortality. This review draws upon evidence in the literature, physiological principles and expert opinion for strategies and guidance to optimise the outcomes of pregnant women in whom blood transfusion is either refused or impossible. The importance of a multidisciplinary antenatal and perinatal management plan, including optimisation of haemoglobin and iron stores pre-delivery, blood loss minimisation, early haemorrhage control and postpartum anaemia treatment, is discussed. Copyright © 2015 The Royal Australian and New Zealand College of Obstetricians and Gynaecologists.

**Database:** EMBASE

**15. An update on the use of massive transfusion protocols in obstetrics.**

**Author(s):** Pacheco, Luis D; Saade, George R; Costantine, Maged M; Clark, Steven L; Hankins, Gary D V

**Source:** American journal of obstetrics and gynecology; Mar 2016; vol. 214 (no. 3); p. 340-344

**Publication Date:** Mar 2016

**Publication Type(s):** Journal Article Review

**PubMedID:** 26348379

**Abstract:**Obstetrical hemorrhage remains a leading cause of maternal mortality worldwide. New concepts involving the pathophysiology of hemorrhage have been described and include early activation of both the protein C and fibrinolytic pathways. New strategies in hemorrhage treatment include the use of hemostatic resuscitation, although the optimal ratio to administer the various blood products is still unknown. Massive transfusion protocols involve the early utilization of blood products and limit the traditional approach of early massive crystalloid-based resuscitation. The evidence behind hemostatic resuscitation has changed in the last few years, and debate is ongoing regarding optimal transfusion strategies. The use of tranexamic acid, fibrinogen concentrates, and prothrombin complex concentrates has emerged as new potential alternative treatment strategies with improved safety profiles.

**Database:** Medline

**16. Postpartum hemorrhage: Guidelines for clinical practice from the French College of Gynaecologists and Obstetricians (CNGOF): In collaboration with the French Society of Anesthesiology and Intensive Care (SFAR)**

**Author(s):** Sentilhes L.; Vayssiere C.; Deneux-Tharaux C.; Bonnet M.-P.; Goffinet F.; Aya A.G.; Bayoumeu F.; Mignon A.; Djoudi R.; Dolley P.; Dreyfus M.; Ducroux-Schouwey C.; Phan E.; Dupont C.; Huissoud C.; Francois A.; Gallot D.; Haumonte J.-B.; Kayem G.; Keita H.; Langer B.; Morel O.; Parant O.; Pelage J.-P.; Rossignol M.; Tessier V.; Mercier F.J.

**Source:** European Journal of Obstetrics Gynecology and Reproductive Biology; Mar 2016; vol. 198 ; p. 12-21

**Publication Date:** Mar 2016

**Publication Type(s):** Review

**PubMedID:** 26773243

**Abstract:**Postpartum haemorrhage (PPH) is defined as blood loss  $\geq 500$  mL after delivery and severe PPH as blood loss  $\geq 1000$  mL, regardless of the route of delivery (professional consensus). The preventive administration of uterotonic agents just after delivery is effective in reducing the incidence of PPH and its systematic use is recommended, regardless of the route of delivery (Grade A). Oxytocin is the first-line prophylactic drug, regardless of the route of delivery (Grade A); a slowly dose of 5 or 10 IU can be administered (Grade A) either IV or IM (professional consensus). After vaginal delivery, routine cord drainage (Grade B), controlled cord traction (Grade A), uterine massage (Grade A), and routine bladder voiding (professional consensus) are not systematically recommended for PPH prevention. After caesarean delivery, placental delivery by controlled cord traction is recommended (grade B). The routine use of a collector bag to assess postpartum blood loss at vaginal delivery is not systematically recommended (Grade B), since the incidence of severe PPH is not affected by this intervention. In cases of overt PPH after vaginal delivery, placement of a blood collection bag is recommended (professional consensus). The initial treatment of PPH consists in a manual uterine examination, together with antibiotic prophylaxis, careful visual assessment of the lower genital tract, a uterine massage, and the administration of 5-10 IU oxytocin injected slowly IV or IM, followed by a maintenance infusion not to exceed a cumulative dose of 40 IU (professional consensus). If oxytocin fails to control the bleeding, the administration of sulprostone is recommended within 30 minutes of the PPH diagnosis (Grade C). Intrauterine balloon tamponade can be performed if sulprostone fails and before recourse to either surgery or interventional radiology (professional consensus). Fluid resuscitation is recommended for PPH persistent after first line uterotonics, or if clinical signs of severity (Grade B). The objective of RBC transfusion is to maintain a haemoglobin concentration (Hb)  $>8$  g/dL. During active haemorrhaging, it is desirable to maintain a fibrinogen level  $\geq 2$  g/L (professional consensus). RBC, fibrinogen and fresh frozen plasma (FFP) may be administered without awaiting laboratory results (professional consensus). Tranexamic acid may be used at a dose of 1 g, renewable once if ineffective the first time in the treatment of PPH when bleeding persists after sulprostone administration (professional consensus), even though its clinical value has not yet been demonstrated in obstetric settings. It is recommended to prevent and treat hypothermia in women with PPH by warming infusion solutions and blood products and by active skin warming (Grade C). Oxygen administration is recommended in women with severe PPH (professional consensus). If PPH is not controlled by pharmacological treatments and possibly intra-uterine balloon, invasive treatments by arterial embolization or surgery are recommended (Grade C). No technique for conservative surgery is favoured over any other (professional consensus). Hospital-to-hospital transfer of a woman with a PPH for embolization is possible once hemoperitoneum is ruled out and if the patient's hemodynamic condition so allows (professional consensus). Copyright © 2016 Elsevier Ireland Ltd. All rights reserved.

**Database:** EMBASE

**17. The haematological features and transfusion management of women who required massive transfusion for major obstetric haemorrhage in the UK: a population based study.**

**Author(s):** Green, Laura; Knight, Marian; Seeney, Frances; Hopkinson, Cathy; Collins, Peter W; Collis, Rachel E; Simpson, Nigel A B; Weeks, Andrew; Stanworth, Simon J

**Source:** British journal of haematology; Feb 2016; vol. 172 (no. 4); p. 616-624

**Publication Date:** Feb 2016

**Publication Type(s):** Research Support, Non-u.s. Gov't Multicenter Study Journal Article  
Observational Study

**PubMedID:** 26683982

Available at [British journal of haematology](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:** Understanding the coagulopathy of major-obstetric-haemorrhage (MOH) that leads to massive-transfusion (MT) is fundamental to improving outcomes. This study reports on the haematological features and transfusion management of women experiencing MT [defined as transfusion of  $\geq 8$  units of red blood cells (RBC) within 24 h of delivery]. One hundred and eighty-one cases [median (interquartile range; IQR) age 33 years (29-36)] were identified from all UK hospitals, using the UK Obstetric Surveillance System between July 2012 and June 2013. The median (IQR) estimated blood loss was 6 l (4.5-8). At presentation, the median platelet count was lowest for placenta accreta, compared with other causes, while the median prothrombin time and fibrinogen were  $<1.5 \times$  mean normal and  $<3$  g/l, respectively for all aetiologies. Median platelet count and fibrinogen fell to  $<75 \times 10^9$  /l and  $<2$  g/l, respectively for all causes during bleeding, except for trauma. The median (IQR) units of RBC, fresh-frozen-plasma (FFP) and cryoprecipitate transfused were 10 (8-14), 6 (4-8) and 2 (2-4), respectively. The median time from the onset of bleeding to delivery of the first RBC unit was significantly shorter for women who delivered via elective caesarean section, compared with others. The coagulopathy of MT during MOH differs significantly depending on its cause, suggesting that more targeted transfusion strategies are required.

**Database:** Medline

**18. Tranexamic acid for preventing postpartum blood loss after cesarean delivery: a systematic review and meta-analysis of randomized controlled trials.**

**Author(s):** Simonazzi, Giuliana; Bisulli, Maria; Saccone, Gabriele; Moro, Elisa; Marshall, Ariela; Berghella, Vincenzo

**Source:** Acta obstetricia et gynecologica Scandinavica; Jan 2016; vol. 95 (no. 1); p. 28-37

**Publication Date:** Jan 2016

**Publication Type(s):** Meta-analysis Journal Article Review

**PubMedID:** 26698831

Available at [Acta obstetricia et gynecologica Scandinavica](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**INTRODUCTIONThere are several published clinical trials of the use of tranexamic acid (TXA) in an obstetric setting, but no consensus on its use or guidelines for management.MATERIAL AND METHODSThe aim of this meta-analysis was to evaluate the effectiveness of TXA in reducing blood loss when given prior to cesarean delivery. We performed a systematic search in electronic databases. We included all randomized controlled trials comparing the use of TXA prior to cesarean delivery with controls (either placebo or no treatment).RESULTSNine trials with 2365 women were included in the analysis. Women who received TXA had significantly less postpartum blood loss, a lower drop in hemoglobin and a lower incidence of postpartum hemorrhage and severe postpartum hemorrhage compared with controls. Moreover, the number of women who needed additional uterotonic agents was significantly lower in the TXA group than in controls. The percentage of women who required blood transfusions at, or immediately after, cesareans was significantly lower in the intervention group than in the controls. There was no difference in the incidence of thromboembolic events in the two groups.CONCLUSIONSProphylactic TXA given before cesarean skin incision in women undergoing cesarean delivery, under spinal or epidural anesthesia, significantly decreases blood loss, including postpartum hemorrhage and severe postpartum hemorrhage, in addition to the standard prophylactic oxytocin given after delivery of the neonate. The effect of TXA on thromboembolic events and mortality as well as its use in high-risk women should be investigated further.

**Database:** Medline

## 19. Anesthesiologic management of major obstetrical hemorrhage

**Author(s):** Vuilleumier P.H.; Surbek D.

**Source:** Trends in Anaesthesia and Critical Care; Dec 2015; vol. 5 (no. 6); p. 167-178

**Publication Date:** Dec 2015

**Publication Type(s):** Review

**Abstract:**Postpartum hemorrhage (PPH) remains a considerable burden on maternal morbidity and mortality, accounting for 80% of severe maternal morbidity. Although a consensus on definitions on major obstetrical bleeding is lacking, postpartum blood losses greater than 500 ml after vaginal delivery and 1000 ml after cesarean section is considered as postpartum hemorrhage; a blood loss greater than 2500 ml is considered as severe postpartum hemorrhage. The definition of major obstetrical hemorrhage (MOH) is a broader term characterizing antenatal or postpartal bleeding. Approximately only 10% of MOH is predictable, as etiologies and risk factors leading to MOH are still poorly understood. This lack of predictability may result in delays for initiation of proper anesthesiologic management of MOH. The quantity of blood loss, combined to the rapidity in which blood loss happens in case of MOH remains an important challenge anesthesiologic teams otherwise usually face only in major vascular or trauma surgery. Preservation of maternal fertility is one of the major aims after maternal and neonatal resuscitation has been granted. Drugs used to increase uterine tone are reviewed in detail, as well as surgical measures available today. Fortunately lessons learned from trauma management have been implemented in major MOH protocols. Not only is maternal and neonatal well being the primary aim to keep in sight, preservation of fertility whenever possible is the next aim anesthesiologists are facing. Copyright © 2015 Elsevier Ltd.

**Database:** EMBASE

## 20. Transfusion and coagulation management in major obstetric hemorrhage.

**Author(s):** Butwick, Alexander J; Goodnough, Lawrence T

**Source:** Current opinion in anaesthesiology; Jun 2015; vol. 28 (no. 3); p. 275-284

**Publication Date:** Jun 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Journal Article Review

**PubMedID:** 25812005

Available at [Current opinion in anaesthesiology](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:**PURPOSE OF REVIEWMajor obstetric hemorrhage is a leading cause of maternal morbidity and mortality. We will review transfusion strategies and the value of monitoring the maternal coagulation profile during severe obstetric hemorrhage.RECENT FINDINGSEpidemiologic studies indicate that rates of severe postpartum hemorrhage (PPH) in well resourced countries are increasing. Despite these increases, rates of transfusion in obstetrics are low (0.9-2.3%), and investigators have questioned whether a predelivery 'type and screen' is cost-effective for all obstetric patients. Instead, blood ordering protocols specific to obstetric patients can reduce unnecessary antibody testing. When severe PPH occurs, a massive transfusion protocol has attracted interest as a key therapeutic resource by ensuring sustained availability of blood products to the labor and delivery unit. During early postpartum bleeding, recent studies have shown that hypofibrinogenemia is an important predictor for the later development of severe PPH. Point-of-care technologies, such as thromboelastography and rotational thromboelastometry, can identify decreased fibrin clot quality during PPH, which correlate with low fibrinogen levels.SUMMARYA massive transfusion protocol provides a key resource in the management of severe PPH. However,

future studies are needed to assess whether formula-driven vs. goal-directed transfusion therapy improves maternal outcomes in women with severe PPH.

**Database:** Medline

## **21. Tranexamic acid for preventing postpartum haemorrhage.**

**Author(s):** Novikova, Natalia; Hofmeyr, G Justus; Cluver, Catherine

**Source:** The Cochrane database of systematic reviews; Jun 2015 (no. 6); p. CD007872

**Publication Date:** Jun 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Meta-analysis Journal Article Review

**PubMedID:** 26079202

**Abstract:**BACKGROUND Postpartum haemorrhage (PPH) is a common and potentially life-threatening complication of labour. Several options for preventing PPH are available, but further advances in this field are important, especially the identification of safe, easy to use and cost-effective regimens. Tranexamic acid (TA), which is an antifibrinolytic agent that is used widely to prevent and treat haemorrhage, merits evaluation to assess whether it meets these criteria. OBJECTIVES To determine, from the best available evidence, whether TA is effective and safe for preventing PPH in comparison to placebo or no treatment (with or without uterotonic co-treatment), or to uterotonic agents. SEARCH METHODS We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (28 January 2015) and reference lists of retrieved studies. SELECTION CRITERIA All published, unpublished and ongoing randomised controlled trials (RCTs) evaluating the use of TA alone or in addition to uterotonics in the third stage of labour or during caesarean section (CS) to prevent PPH. DATA COLLECTION AND ANALYSIS Two review authors independently assessed for inclusion all the potential studies identified as a result of the search strategy. We entered the data into Review Manager software and checked for accuracy. MAIN RESULTS Twelve trials involving 3285 healthy women at low risk of excessive bleeding undergoing elective CS (nine trials, 2453 participants) or spontaneous birth (three trials, 832 participants) satisfied inclusion criteria and contributed data to the analysis. All participants received routine prophylactic uterotonics in accordance with the local guideline in addition to TA or placebo or no intervention. Overall, included studies had moderate risk of bias for random sequence generation, allocation concealment, blinding, selective reporting and low risk of bias for incomplete data. The quality of evidence was also as assessed using GRADE. Blood loss greater than 400 mL or 500 mL, and more than 1000 mL was less common in women who received TA versus placebo or no intervention (risk ratio (RR) 0.52, 95% confidence interval (CI) 0.42 to 0.63, six trials, 1398 women; moderate quality evidence) and (RR 0.40, 95% CI 0.23 to 0.71, six trials, 2093 women; moderate quality evidence), respectively. TA was effective in decreasing the incidence of blood loss greater than 1000 mL in women who had undergone CS (RR 0.43, 95% CI 0.23, 0.78, four trials, 1534 women), but not vaginal birth (RR 0.28, 95% CI 0.06, 1.36, two trials 559 women). The effect of TA on blood loss greater than 500 mL or 400 mL was more pronounced in the group of women having vaginal birth than in women who had CS. Mean blood loss (from delivery until two hours postpartum) was lower in women who received TA versus placebo or no intervention (mean difference MD - 77.79 mL, 95% CI -97.95, -57.64, five trials, 1186 women) and this effect was similar following vaginal birth and CS. Additional medical interventions (moderate quality evidence) and blood transfusions were less frequent in women receiving TA versus placebo or no interventions. Mild side effects such as nausea, vomiting, dizziness were more common with the use of TA (moderate quality evidence). The effect of TA on maternal mortality, severe morbidity and thromboembolic events is uncertain (low quality evidence). AUTHORS' CONCLUSIONS TA (in addition to uterotonic medications) decreases postpartum blood loss and prevents PPH and blood transfusions following vaginal birth and CS in women at low risk of PPH based on studies of mixed quality. There is insufficient evidence to draw conclusions about serious side effects, but there is an

increase in the incidence of minor side effects with the use of TA. Effects of TA on thromboembolic events and mortality as well as its use in high-risk women should be investigated further.

**Database:** Medline

**22. Recombinant human FVIIa for reducing the need for invasive second-line therapies in severe refractory postpartum hemorrhage: A multicenter, randomized, open controlled trial**

**Author(s):** Lavigne-Lissalde G.; Gris J.-C.; Aya A.G.; Mercier F.J.; Roger-Christoph S.; Chauleur C.; Morau E.; Ducloy-Bouthors A.S.; Mignon A.; Raucoles M.; Bongain A.; Boehlen F.; de Moerloose P.; Bouvet S.; Fabbro-Peray P.

**Source:** Journal of Thrombosis and Haemostasis; Apr 2015; vol. 13 (no. 4); p. 520-529

**Publication Date:** Apr 2015

**Publication Type(s):** Article

**PubMedID:** 25594352

Available at [Journal of Thrombosis and Haemostasis](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**Background: Case reports on recombinant human factor VIIa (rhuFVIIa) use in women with severe postpartum hemorrhage (PPH) showed encouraging results, but no randomized controlled trial (RCT) is available. Patients and methods: Eighty-four women with severe PPH unresponsive to uterotonics were randomized to receive one early single rhuFVIIa infusion (n = 42) or standard care (no rhuFVIIa; n = 42). The primary efficacy outcome measure was the reduction of the need for specific second-line therapies, such as interventional hemostatic procedures, for blood loss and transfusions. The primary safety outcome measure was the number of deaths and thrombotic events during the 5 days following rhuFVIIa infusion. Results: rhuFVIIa was associated with a reduction in the number of patients who needed second-line therapies compared with controls (standard care). Specifically, 39/42 (93%) patients in the standard care arm received second-line therapies and 22/42 (52%) patients in the rhuFVIIa arm (absolute difference, 41%; range, 18-63%; relative risk RR, 0.56 [0.42-0.76]). The delivery mode (vaginal or Cesarean section) did not affect the primary outcome. No death occurred. Two venous thrombotic events were recorded in the rhuFVIIa arm: one ovarian vein thrombosis and one deep vein thrombosis with a non-severe pulmonary embolism. Conclusion: This open RCT in women with severe PPH refractory to uterotonics shows that rhuFVIIa reduces the need for specific second-line therapies in about one in three patients, with the occurrence of non-fatal venous thrombotic events in one in 20 patients. Copyright © 2015 International Society on Thrombosis and Haemostasis.

**Database:** EMBASE



### **23. Non-pneumatic anti-shock garment for improving maternal survival following severe postpartum haemorrhage: A systematic review**

**Author(s):** Pileggi-Castro C.; Nogueira-Pileggi V.; Tuncalp; Oladapo O.T.; Vogel J.P.; Souza J.P.

**Source:** Reproductive Health; Mar 2015 ; p. 1-13

**Publication Date:** Mar 2015

**Publication Type(s):** Article In Press

Available at [Reproductive Health](#) - from BioMed Central

**Abstract:**Introduction: Women with postpartum haemorrhage (PPH) in developing countries often present in critical condition when treatment might be insufficient to save lives. Few studies have shown that application of non-pneumatic anti-shock garment (NASG) could improve maternal survival. Methods: A systematic review of the literature explored the effect of NASG use compared with standard care for treating PPH. Medline, EMBASE and PubMed were searched. Methodological quality was assessed following the criteria suggested by the Cochrane Effective Practice and Organization of Care Group. Guidelines on Meta-analysis of Observational Studies in Epidemiology were used for reporting the results. Mantel-Haenszel methods for meta-analysis of risk ratios were used. Results: Six out 31 studies met the inclusion criteria; only one cluster randomized controlled trial (c-RCT). Among observational studies, NASG fared better than standard care regarding maternal mortality reduction (Relative Risk (RR) 0.52 (95% Confidence interval (CI) 0.36 to 0.77)). A non-significant reduction of maternal mortality risk was observed in the c-RCT (RR: 0.43 (95% CI: 0.14 to 1.33)). No difference was observed between NASG use and standard care on use of blood products. Severe maternal outcomes were used as proxy for maternal death with similar pattern corroborating the trend towards beneficial effects associated with NASG. Conclusion: NASG is a temporizing alternative measure in PPH management that shows a trend to reduce PPH-related deaths and severe morbidities. In settings where delays in PPH management are common, particularly where constraints to offer blood products and definitive treatment exist, use of NASG is an intervention that should be considered as a policy option while the standard conditions for care are being optimized. Copyright © 2015 Pileggi-Castro et al.; licensee BioMed Central.

**Database:** EMBASE

**24. Introduction of an algorithm for ROTEM-guided fibrinogen concentrate administration in major obstetric haemorrhage.**

**Author(s):** Mallaiah, S; Barclay, P; Harrod, I; Chevannes, C; Bhalla, A

**Source:** Anaesthesia; Feb 2015; vol. 70 (no. 2); p. 166-175

**Publication Date:** Feb 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Comparative Study Clinical Trial Journal Article

**PubMedID:** 25289791

Available at [Anaesthesia](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:** We compared blood component requirements during major obstetric haemorrhage, following the introduction of fibrinogen concentrate. A prospective study of transfusion requirements and patient outcomes was performed for 12 months to evaluate the major obstetric haemorrhage pathway using shock packs (Shock Pack phase). The study was repeated after the pathway was amended to include fibrinogen concentrate (Fibrinogen phase). The median (IQR [range]) number of blood components given was 8.0 (3.0-14.5 [0-32]) during the Shock Pack phase, and 3.0 (2.0-5.0 [0-26]) during the Fibrinogen phase ( $p = 0.0004$ ). The median (IQR [range]) quantity of fibrinogen administered was significantly greater in the Shock Pack phase, 3.2 (0-7.1 [0-20.4]) g, than in the Fibrinogen phase, 0 (0-3.0 [0-12.4]) g,  $p = 0.0005$ . Four (9.5%) of 42 patients in the Shock Pack phase developed transfusion associated circulatory overload compared with none of 51 patients in the Fibrinogen phase ( $p = 0.038$ ). Fibrinogen concentrate allows prompt correction of coagulation deficits associated with major obstetric haemorrhage, reducing the requirement for blood component therapy and the attendant risks of complications.

**Database:** Medline

**25. Temporary balloon occlusion of the internal iliac arteries to prevent massive hemorrhage during cesarean delivery among patients with placenta previa.**

**Author(s):** Broekman, Evelien A; Versteeg, Henneke; Vos, Louwerens D; Dijksterhuis, Marja G; Papatsonis, Dimitri N

**Source:** International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics; Feb 2015; vol. 128 (no. 2); p. 118-121

**Publication Date:** Feb 2015

**Publication Type(s):** Journal Article

**PubMedID:** 25476153

Available at [International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**OBJECTIVE To evaluate the effectiveness of temporary balloon occlusion of the internal iliac artery before uterine incision to prevent massive obstetric hemorrhage during cesarean delivery among patients with anterior placenta previa. METHODS In a retrospective cohort study conducted at Amphia Hospital Breda (Breda, Netherlands), data were analyzed from women with anterior placenta previa who delivered by cesarean between January 1, 2001, and September 30, 2012. Cases with and without balloon occlusion of the internal iliac artery were included. The primary outcomes were the amount of blood loss during cesarean delivery, drop of hemoglobin level, and blood loss of more than 1000 mL. RESULTS Of 68 eligible women, 42 (62%) had temporary balloon occlusion and 26 (38%) had no balloon occlusion. Median blood loss was 800 mL (interquartile range [IQR] 488-1113) in the balloon group and 1000 mL (IQR 694-1307) in the no balloon group ( $P=0.06$ ). Blood loss of 1000 mL or more was recorded in 16 (38%) women in the balloon group and 18 (69%) in the no balloon group ( $P=0.01$ ). CONCLUSION Temporary balloon occlusion of the internal iliac artery before uterine incision during cesarean delivery could potentially reduce blood loss among patients with anterior placenta previa. Large, randomized controlled trials are needed to confirm the results.

**Database:** Medline

## **26. Usefulness of shock indicators for determining the need for blood transfusion after massive obstetric hemorrhage.**

**Author(s):** Era, Sumiko; Matsunaga, Shigetaka; Matsumura, Hideyoshi; Murayama, Yoshihiko; Takai, Yasushi; Seki, Hiroyuki

**Source:** The journal of obstetrics and gynaecology research; Jan 2015; vol. 41 (no. 1); p. 39-43

**Publication Date:** Jan 2015

**Publication Type(s):** Journal Article

**PubMedID:** 25164603

Available at [The journal of obstetrics and gynaecology research](#) - from Wiley Online Library  
Medicine and Nursing Collection 2017 - NHS

**Abstract:**AIM Massive obstetric hemorrhage (MOH) requires prompt transfusion of red blood cells and coagulation factors. Because MOH has a diverse pathogenesis, the shock index (SI) alone may be insufficient for determining blood transfusion. Here, we retrospectively analyzed patients with MOH to determine usefulness of the indicators of shock including the SI in evaluating the need for blood transfusion. METHODS We reviewed records of 80 emergency referral patients who had received blood transfusions at our department between 1 January 2009 and 31 July 2011. The shock indicators for blood transfusion are estimated blood loss, fibrinogen level, hemoglobin concentration, the Japan Society of Obstetrics and Gynecology disseminated intravascular coagulation (JSOG DIC) score and the SI. The strength of the correlation of each shock indicator with the transfusion volume was ranked using Spearman's rank correlation coefficient- $\rho$  and multivariate analysis. RESULTS Although the SI showed significant positive correlation with blood transfusion volume for red blood cell concentrate (RCC) and fresh frozen plasma (FFP) in patients with dilutional coagulopathy, a stronger correlation was seen with the fibrinogen level and JSOG DIC score. In patients with consumptive coagulopathy, the strongest correlation was seen between RCC transfusion volume and fibrinogen level, and between FFP transfusion volume and JSOG DIC score followed by fibrinogen level. In multivariate analysis, only fibrinogen level was significantly associated with both RCC and FFP massive transfusion. CONCLUSION Because MOH has a diverse pathogenesis, various indicators should be evaluated. Among shock indicators, fibrinogen level was the best indicator of the need for blood transfusion following MOH.

**Database:** Medline

## **27. Haemostatic management of obstetric haemorrhage**

**Author(s):** Collis R.E.; Collins P.W.

**Source:** Anaesthesia; Jan 2015; vol. 70 ; p. 78-8

**Publication Date:** Jan 2015

**Publication Type(s):** Review

**PubMedID:** 25440400

Available at [Anaesthesia](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**The haemostatic management of major obstetric haemorrhage remains challenging, and current published guidance relies heavily on experience from the non-pregnant population and expert opinion. In recent years, an interest in the implications of relative hypofibrinogenaemia, point-of-care monitoring of coagulation abnormalities, and the potential to give goal-directed therapy to correct coagulopathies, have created the possibility of significantly challenging and changing guidance. There is evidence that the haemostatic impairment in the pregnant population is different from trauma-induced bleeding, and the type and rate of onset of coagulopathies differ depending on the underlying cause. This review examines areas such as possible intervention points, describes evidence for over-transfusion of fresh frozen plasma in some situations and challenges conventional thinking on formulaic management. It also examines the rationale for other therapeutic options, including fibrinogen concentrate and tranexamic acid. Copyright © 2014 The Association of Anaesthetists of Great Britain and Ireland.

**Database:** EMBASE

## **28. Volume replacement following severe postpartum hemorrhage**

**Author(s):** Schorn M.N.; Phillippi J.C.

**Source:** Journal of Midwifery and Women's Health; 2014; vol. 59 (no. 3); p. 336-343

**Publication Date:** 2014

**Publication Type(s):** Article

**PubMedID:** 24751109

Available at [Journal of Midwifery and Women's Health](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**Severe postpartum hemorrhage (PPH) can be defined as a blood loss of more than 1500 mL to 2500 mL. While rare, severe PPH is a significant contributor to maternal mortality and morbidity in the United States and throughout the world. Due to the maternal hematologic adaptation to pregnancy, the hypovolemia resulting from hemorrhage can be asymptomatic until a large amount of blood is lost. Rapid replacement of lost fluids can mitigate effects of severe hemorrhage. Current evidence on postpartum volume replacement suggests that crystalloid fluids should be used only until the amount of blood loss becomes severe. Once a woman displays signs of hypovolemia, blood products including packed red blood cells, fresh frozen plasma, platelets, and recombinant factor VIIa should be used for volume replacement. Overuse of crystalloid fluids increases the risk for acute coagulopathy and third spacing of fluids. A massive transfusion protocol is one mechanism to provide a rapid, consistent, and evidence-based team response to this life-threatening condition. © 2014 by the American College of Nurse-Midwives.

**Database:** EMBASE

### **29. Appropriate second-line therapies for management of severe postpartum hemorrhage.**

**Author(s):** Zhao, Ying; Zhang, Yunping; Li, Zhao

**Source:** International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics; Nov 2014; vol. 127 (no. 2); p. 180-182

**Publication Date:** Nov 2014

**Publication Type(s):** Journal Article

**PubMedID:** 25277790

Available at [International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**OBJECTIVETo explore appropriate second-line therapies for management of severe postpartum hemorrhage at cesarean delivery.METHODSA retrospective study was done of 87 women who underwent cesarean delivery and received uterotonics after placental separation at the Beijing Haidian Maternal and Child Health Hospital, China, between 2009 and 2013. Group 1 (n=52) included patients with 500-700 mL of blood loss before application of intrauterine gauze tamponade or B-Lynch suture as second-line therapy, while group 2 (n=35) included patients with blood loss of more than 700 mL before application of either gauze tamponade or B-Lynch suture.RESULTSManagement was successful in all patients in group 1. In group 2, additional management was needed in three of four patients who underwent a B-lynch suture. Factors significantly associated with total blood loss were blood loss before application of second-line therapy ( $P<0.001$ ), fibrinogen levels ( $P<0.001$ ), and time from placental separation to second-line therapy ( $P=0.015$ ).CONCLUSIONWhen blood loss is 500-700 mL, compression sutures or intrauterine gauze tamponade can be used as second-line treatment of postpartum hemorrhage. When blood loss is more than 700 mL, intrauterine gauze tamponade should be used.

**Database:** Medline

### **30. Medical advances in the treatment of postpartum hemorrhage.**

**Author(s):** Ducloy-Bouthors, Anne-Sophie; Susen, Sophie; Wong, Cynthia A; Butwick, Alex; Vallet, Benoit; Lockhart, Evelyn

**Source:** Anesthesia and analgesia; Nov 2014; vol. 119 (no. 5); p. 1140-1147

**Publication Date:** Nov 2014

**Publication Type(s):** Research Support, N.i.h., Extramural Journal Article Review

**PubMedID:** 25329026

Available at [Anesthesia and analgesia](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:**Postpartum hemorrhage (PPH) is a leading cause of maternal mortality worldwide. Recent advances in the management of severe bleeding for trauma patients may provide insight into PPH management, but must be applied with caution considering the significant differences between trauma and obstetric patients. In this review, we summarized evidence for current management strategies for patients with major obstetric hemorrhage, including (1) rapid laboratory assessment of coagulopathy, (2) early transfusion of plasma and high plasma-to-red blood cell transfusion ratios in massive PPH, and (3) use of tranexamic acid and fibrinogen concentrates in the setting of PPH complicated by coagulopathy.

**Database:** Medline

### **31. Postpartum haemorrhage and haematological management**

**Author(s):** Pinas Carillo A.; Chandraharan E.

**Source:** Obstetrics, Gynaecology and Reproductive Medicine; Oct 2014; vol. 24 (no. 10); p. 291-295

**Publication Date:** Oct 2014

**Publication Type(s):** Review

**Abstract:**Postpartum haemorrhage (PPH) is one of the leading causes of maternal morbidity and mortality around the world. In the UK, the Centre for Maternal and Child Enquiries (CMACE) confirmed a reduction in maternal deaths due to postpartum haemorrhage during the last Triennium (2006-2008). However, substandard care continues to contribute to more than half of maternal deaths due to postpartum haemorrhage. Primary PPH is defined by the Royal College of Obstetricians and Gynaecologists (RCOG) Green Top Guideline on Postpartum Haemorrhage as a blood loss of 500 ml or more within 24 hours of the birth. It is further classified into minor (500-1000 ml) or major (>1000 ml) with a further sub classification into moderate (1000-2000 ml) or severe (>2000 ml or >30% of blood volume). Secondary PPH is defined as excessive bleeding between 24 hours and 12 weeks postnatally. A timely, multi-disciplinary and systematic approach to restore the volume and clotting system whilst arresting bleeding is essential to improve maternal morbidity and mortality. Although in some cases, massive obstetric haemorrhage can be anticipated and prevented, such as morbidly adherent placenta, it often occurs unexpectedly in women considered at 'low risk'. Hence, all clinicians involved in the care of women during pregnancy and delivery should have the knowledge and skills to promptly recognize symptoms, signs and complications of PPH and immediately activate the appropriate protocol which could save lives. Copyright © 2014 Elsevier Ltd.

**Database:** EMBASE

### **32. Transfusion policy after severe postpartum haemorrhage: a randomised non-inferiority trial.**

**Author(s):** Prick, B W; Jansen, A J G; Steegers, E A P; Hop, W C J; Essink-Bot, M L; Uyl-de Groot, C A; Akerboom, B M C; van Alphen, M; Bloemenkamp, K W M; Boers, K E; Bremer, H A; Kwee, A; van Loon, A J; Metz, G C H; Papatsonis, D N M; van der Post, J A M; Porath, M M; Rijnders, R J P; Roumen, F J M E; Scheepers, H C J; Schippers, D H; Schuitemaker, N W E; Stigter, R H; Woiski, M D; Mol, B W J; van Rhenen, D J; Duvekot, J J

**Source:** BJOG : an international journal of obstetrics and gynaecology; Jul 2014; vol. 121 (no. 8); p. 1005-1014

**Publication Date:** Jul 2014

**Publication Type(s):** Research Support, Non-u.s. Gov't Randomized Controlled Trial Multicenter Study Journal Article

**PubMedID:** 24405687

Available at [BJOG : an international journal of obstetrics and gynaecology](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**OBJECTIVE To assess the effect of red blood cell (RBC) transfusion on quality of life in acutely anaemic women after postpartum haemorrhage. DESIGN Randomised non-inferiority trial. SETTING Thirty-seven Dutch university and general hospitals. POPULATION Women with acute anaemia (haemoglobin 4.8-7.9 g/dl [3.0-4.9 mmol/l] 12-24 hours postpartum) without severe anaemic symptoms or severe comorbidities. METHODS Women were allocated to RBC transfusion or non-intervention. MAIN OUTCOME MEASURES Primary outcome was physical fatigue 3 days postpartum (Multidimensional Fatigue Inventory, scale 4-20; 20 represents maximal fatigue). Non-inferiority was demonstrated if the physical fatigue difference between study arms was maximal 1.3. Secondary outcomes were health-related quality of life and physical complications. Health-related quality of life questionnaires were completed at five time-points until 6 weeks postpartum. RESULTS In all, 521 women were randomised to non-intervention (n = 262) or RBC transfusion (n = 259). Mean physical fatigue score at day 3 postpartum, adjusted for baseline and mode of delivery, was 0.8 lower in the RBC transfusion arm (95% confidence interval: 0.1-1.5, P = 0.02) and at 1 week postpartum was 1.06 lower (95% confidence interval: 0.3-1.8, P = 0.01). A median of two RBC units was transfused in the RBC transfusion arm. In the non-intervention arm, 33 women received RBC transfusion, mainly because of anaemic symptoms. Physical complications were comparable. CONCLUSIONS Statistically, non-inferiority could not be demonstrated as the confidence interval crossed the non-inferiority boundary. Nevertheless, with only a small difference in physical fatigue and no differences in secondary outcomes, implementation of restrictive management seems clinically justified.

**Database:** Medline



**33. Use of an intrauterine inflated catheter balloon in massive post-partum hemorrhage: a series of 52 cases.**

**Author(s):** Ferrazzani, Sergio; Iadarola, Roberta; Perrelli, Alessandra; Botta, Angela; Moresi, Sascia; Salvi, Silvia; Santucci, Stefania; Degennaro, Valentina Anna; De Carolis, Sara

**Source:** The journal of obstetrics and gynaecology research; Jun 2014; vol. 40 (no. 6); p. 1603-1610

**Publication Date:** Jun 2014

**Publication Type(s):** Journal Article

**PubMedID:** 24888923

Available at [The journal of obstetrics and gynaecology research](#) - from Wiley Online Library  
Medicine and Nursing Collection 2017 - NHS

**Abstract:**AIM Massive post-partum hemorrhage (PPH) is an important cause of maternal death that occurs as a complication of delivery. We report a large case series to evaluate the efficacy of uterine balloon tamponade to treat PPH avoiding hysterectomy. MATERIAL AND METHOD This prospective study was conducted in two Italian hospitals (from December 2002 to July 2012). Fifty-two patients with PPH not responsive to uterotonics were treated by Rusch balloon. A follow-up was conducted among the study population to assess the subsequent fertility. RESULT The most frequent cause of PPH was atony (59.6%), followed by placenta previa (21.2%), placenta accreta (9.6%), and placenta previa and accreta (9.6%). The balloon success rate to control hemorrhage was 75%. From the sample of 52 patients, 13 patients needed additional procedures. In three failure cases, other conservative techniques were used and the overall effectiveness of them was 80.7%. The follow-up group consisted of 31 women. Of these women, 24 women (77.4%) had no further pregnancies, but only one due to sterility. Four of seven patients with subsequent pregnancies made it to term without complications. CONCLUSIONS The Rusch balloon is effective in controlling non-traumatic PPH in 75% of cases. It is simple to use, readily available and cheap. If necessary, this technique does not exclude other procedures. We suggest that this balloon should be included routinely in the PPH protocol.

**Database:** Medline

### **34. Menstrual and fertility outcomes following the surgical management of postpartum haemorrhage: A systematic review**

**Author(s):** Doumouchtsis S.K.; Nikolopoulos K.; Talaulikar V.S.; Krishna A.; Arulkumaran S.

**Source:** BJOG: An International Journal of Obstetrics and Gynaecology; Mar 2014; vol. 121 (no. 4); p. 382-388

**Publication Date:** Mar 2014

**Publication Type(s):** Review

**PubMedID:** 24321038

Available at [BJOG: An International Journal of Obstetrics and Gynaecology](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**Background: Uterine-sparing surgical interventions have long been practiced as an alternative to hysterectomy in the management of severe postpartum haemorrhage (PPH); however, the risks of impairment of subsequent fertility from such procedures are unclear. Objective: To evaluate the menstrual and fertility outcomes following radiological or conservative surgical interventions for severe PPH. Search strategy: A systematic review of English and non-English articles using the Cochrane Library 2012, PubMed (1950-2012), Embase (1980-2012), and the National Research Register. The keywords used for our search included 'fertility', 'reproductive outcome', 'postpartum haemorrhage', 'embolisation', 'hypogastric artery ligation', 'B-Lynch suture', 'stepwise uterine devascularisation', 'tamponade', and 'uterine compression sutures'. Selection criteria: Studies including human female subjects with at least five cases. Data collection and analysis: Independent extraction of articles by two authors using predefined data fields, including study quality indicators. Main results: We identified 402 publications and after exclusions, 28 studies were included in the systematic review. Seventeen studies (675 women) reported on the fertility outcomes after uterine artery embolisation, five studies (195 women) reported on the fertility outcomes after uterine devascularisation, and six studies (125 women) reported on the fertility outcomes following uterine compression sutures. Overall, 553 out of 606 (91.25%) women resumed menstruation within 6 months of delivery. One hundred and eighty-three out of 235 (77.87%) women who desired another pregnancy achieved conception. Author's conclusions: Uterine-sparing radiological and surgical techniques for the management of severe PPH do not appear to adversely affect the menstrual and fertility outcomes in most women; however, the number of studies and the quality of the available evidence is of concern. © 2013 Royal College of Obstetricians and Gynaecologists.

**Database:** EMBASE

### **35. Medical prevention and treatment of postpartum hemorrhage: a comparison of different guidelines.**

**Author(s):** Bohlmann, Michael K; Rath, Werner

**Source:** Archives of gynecology and obstetrics; Mar 2014; vol. 289 (no. 3); p. 555-567

**Publication Date:** Mar 2014

**Publication Type(s):** Comparative Study Journal Article Review

**PubMedID:** 24006033

Available at [Archives of gynecology and obstetrics](#) - from SpringerLink

**Abstract:**BACKGROUND Postpartum hemorrhage (PPH) remains a common cause of maternal mortality worldwide, mainly caused by uterine atony. Medical intervention plays an important part in prevention and therapies of PPH. Prophylactic interventions include the use of uterotonic drugs. We elaborated the consistency of national and international guidelines on those medical approaches. MATERIALS AND METHODS Medical approaches in PPH were extracted from recent publications. Furthermore, the current guidelines of the World Health Organization, the FIGO and of the American, British, Canadian and German Societies of Obstetricians and Gynecologists on PPH were analyzed. RESULTS Oxytocin is considered as therapy of first choice. However, the examined guidelines fail to give unequivocal recommendations on further uterotonics in PPH, which may partially be attributed to differing publication dates of the guidelines. CONCLUSION International guidelines on PPH are characterized by differing recommendations. However, recent publications suggest that adhering to local guidelines significantly reduces the prevalence of severe PPH.

**Database:** Medline

### **36. Major obstetric haemorrhage: monitoring with thromboelastography, laboratory analyses or both?**

**Author(s):** Karlsson, O; Jeppsson, A; Hellgren, M

**Source:** International journal of obstetric anesthesia; Feb 2014; vol. 23 (no. 1); p. 10-17

**Publication Date:** Feb 2014

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article Observational Study

**PubMedID:** 24342222

**Abstract:**BACKGROUND Haemorrhage is a common cause of morbidity and mortality in the obstetric population. The aim of this study was to compare the use of thromboelastography and laboratory analyses to evaluate haemostasis during major obstetric haemorrhage. A secondary aim was to evaluate correlations between the results of thromboelastography, laboratory analyses and estimated blood loss. METHODS Forty-five women with major obstetric haemorrhage and 49 women with blood loss <600 mL were included. The following thromboelastography analyses were performed: time to start of clotting (TEG-R), time to 20 mm of clot firmness (TEG-K), rate of clot growth (TEG-Angle), maximum amplitude of clot (TEG-MA) and lysis after 30 min (TEG-LY30). In addition, platelet count, activated partial thromboplastin time, prothrombin time, fibrinogen, antithrombin and D-dimer were measured. RESULTS Thromboelastography variables reflecting clot stability and fibrinolysis were decreased in women with massive obstetric haemorrhage compared to women with normal bleeding, while clot initiation was accelerated. Laboratory analyses also showed impaired haemostasis with the most pronounced differences in platelet count, fibrinogen concentration and antithrombin activity. The strongest correlations existed between fibrinogen and TEG-MA and between estimated blood loss and TEG-MA, fibrinogen and antithrombin, respectively. CONCLUSIONS Impaired haemostasis, demonstrated by thromboelastography and laboratory analyses, was found after an estimated blood loss of 2000 mL. Thromboelastography

provides faster results than standard laboratory testing which is advantageous in the setting of on-going obstetric haemorrhage. However, laboratory analyses found greater differences in coagulation variables, which correlated better with estimated blood loss.

**Database:** Medline

### **37. How we manage the haematological aspects of major obstetric haemorrhage.**

**Author(s):** Allard, Shubha; Green, Laura; Hunt, Beverley J

**Source:** British journal of haematology; Jan 2014; vol. 164 (no. 2); p. 177-188

**Publication Date:** Jan 2014

**Publication Type(s):** Journal Article Review

**PubMedID:** 24383841

Available at [British journal of haematology](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:** Major obstetric haemorrhage (MOH) remains an important medical challenge worldwide, contributing to significant maternal morbidity and mortality. Prompt and appropriate management is essential if we are to improve outcomes and reduce substandard care that may result in adverse consequences. This review describes the current understanding of the pathophysiological aspects of MOH together with the principles of transfusion and haemostatic therapy, with emphasis on a coordinated multidisciplinary approach. We also highlight the current lack of evidence available from randomized controlled trials to inform best practice and the need to prioritize research in this key clinical area.

**Database:** Medline

### **38. Use of second-line therapies for management of massive primary postpartum hemorrhage**

**Author(s):** Chan L.-L.; Lo T.-K.; Lau W.-L.; Leung W.-C.; Lau S.; Law B.; Tsang H.-H.

**Source:** International Journal of Gynecology and Obstetrics; Sep 2013; vol. 122 (no. 3); p. 238-243

**Publication Date:** Sep 2013

**Publication Type(s):** Article

**PubMedID:** 23806248

Available at [International Journal of Gynecology and Obstetrics](#) - from Wiley Online Library  
Medicine and Nursing Collection 2017 - NHS

**Abstract:**Objective To determine rates of use and success of second-line therapies for massive primary postpartum hemorrhage (PPH). Methods A retrospective cohort study was conducted among 91 women who gave birth at Kwong Wah Hospital, Hong Kong, between January 1, 2006, and December 31, 2011. Inclusion criteria were gestational age of at least 24 weeks and massive PPH (defined as blood loss  $\geq$  1500 mL within 24 hours after birth). Second-line therapies assessed were uterine compression sutures, uterine artery embolization, and balloon tamponade after failure of uterine massage and uterotonic agents to stop bleeding. Results The rate of massive PPH was 2.65 per 1000 births. Second-line therapies were used among 42 women with PPH, equivalent to a rate of 1.23 per 1000 births. Only 21.4% of the women who received second-line therapies required rescue hysterectomy. A rising trend was observed for the use of second-line therapies, whereas the incidence of rescue hysterectomy and estimated blood loss were found to concomitantly decrease. Conclusion Increasing use of second-line therapies among women with massive PPH was associated with a decreasing trend for rescue hysterectomy. Obstetricians should, therefore, consider all available interventions to stop PPH, including early use of second-line options. © 2013 International Federation of Gynecology and Obstetrics.

**Database:** EMBASE

### **39. Recent advances in the management of major obstetric haemorrhage**

**Author(s):** Chavan R.; Latoo M.Y.

**Source:** British Journal of Medical Practitioners; Apr 2013; vol. 6 (no. 1)

**Publication Date:** Apr 2013

**Publication Type(s):** Review

**Database:** EMBASE

#### **40. Postpartum haemorrhage associated with caesarean section and caesarean hysterectomy.**

**Author(s):** Fawcus, Sue; Moodley, Jagidesa

**Source:** Best practice & research. Clinical obstetrics & gynaecology; Apr 2013; vol. 27 (no. 2); p. 233-249

**Publication Date:** Apr 2013

**Publication Type(s):** Journal Article Review

**PubMedID:** 23084097

**Abstract:**Excessive haemorrhage associated with caesarean section, commonly defined as blood loss in excess of 1000 ml, is frequently underestimated, but is documented as occurring in more than 5-10% of caesarean sections. Common causes are uterine atony, abnormal placentation, uterine trauma and sepsis. It is a major cause of maternal morbidity globally and of maternal mortality in low- and middle-income countries; however, many reports do not disaggregate it from postpartum haemorrhage in general. In this chapter, we outline preventive measures, including uterotonic agents, and provide treatment algorithms for managing excessive haemorrhage during and after caesarean section. Several management options, including uterotonic therapy, uterine compression sutures, balloon tamponade, blood-vessel ligation and uterine artery embolisation are described; each has a role for treating the different causes of caesarean section bleeding in different contexts. Caesarean hysterectomy is indicated when medical and conservative surgical measures are unsuccessful, and as first-line surgery for extensive uterine rupture and bleeding from morbidly adherent placentae. It has an incidence ranging from 1-4 per 1000 caesarean sections, significantly greater than that for vaginal delivery. Although it is a life-saving procedure, it is associated with significant morbidity, including massive blood transfusion and intensive care (10-48%), urological injury (8%) and the need for relook laparotomy (8-18%).

**Database:** Medline

#### **41. Recombinant factor VIIa in Post-partum hemorrhage: A new weapon in obstetrician's armamentarium**

**Author(s):** Magon N.; Babu K.M.

**Source:** North American Journal of Medical Sciences; 2012; vol. 4 (no. 4); p. 157-162

**Publication Date:** 2012

**Publication Type(s):** Review

Available at [North American Journal of Medical Sciences](#) - from Europe PubMed Central - Open Access

Available at [North American Journal of Medical Sciences](#) - from Free Medical Journals . com

**Abstract:**Post-partum hemorrhage (PPH) is a life-threatening obstetric complication and the leading cause of maternal death. The usual manner for its management includes, first, noninvasive and nonsurgical methods, and, then invasive and surgical methods. However, mortality and morbidity related to PPH still remains unacceptably high, contributing to hysterectomy in at least 50% of cases. Early, effective, and preferably noninvasive treatments that can reduce maternal mortality and morbidity due to this entity are therefore essential. One of the most spectacular advancements in the control of PPH has been the use of recombinant activated factor (rFVIIa), both as initial and a life- and uterus-saving therapy. rFVIIa also reduces costs of therapy and use of blood components in massive PPH. In cases of intractable bleeding with no other obvious indications for hysterectomy, administration of rFVIIa should be considered before surgery. A MEDLINE search was done to review relevant articles in English literature on use of rFVIIa in PPH. Data were constructed and issues were

reviewed from there. Our experience in a series of three cases of PPH, two of atonic and one of traumatic, successfully managed using rFVIIa is also shared.

**Database:** EMBASE

**42. Obstetric hemorrhage and coagulation: an update. Thromboelastography, thromboelastometry, and conventional coagulation tests in the diagnosis and prediction of postpartum hemorrhage.**

**Author(s):** de Lange, Natascha M; Lancé, Marcus D; de Groot, René; Beckers, Erik A M; Henskens, Yvonne M; Scheepers, Hubertina C J

**Source:** Obstetrical & gynecological survey; Jul 2012; vol. 67 (no. 7); p. 426-435

**Publication Date:** Jul 2012

**Publication Type(s):** Journal Article Review

**PubMedID:** 22926249

Available at [Obstetrical & gynecological survey](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:** Globally, postpartum hemorrhage (PPH) is the leading cause of maternal morbidity and mortality. In the current treatment of severe PPH, first-line therapy includes transfusion of packed cells and fresh-frozen plasma in addition to uterotonic medical management and surgical interventions. In persistent PPH, tranexamic acid, fibrinogen, and coagulation factors are often administered. Secondary coagulopathy due to PPH or its treatment is often underestimated and therefore remains untreated, potentially causing progression to even more severe PPH. In most cases, medical and transfusion therapy is not based on the actual coagulation state because conventional laboratory test results are usually not available for 45 to 60 minutes.

Thromboelastography and rotational thromboelastometry are point-of-care coagulation tests. A good correlation has been shown between thromboelastometric and conventional coagulation tests, and the use of these in massive bleeding in nonobstetric patients is widely practiced and it has been proven to be cost-effective. As with conventional laboratory tests, there is an influence of fluid dilution on coagulation test results, which is more pronounced with colloid fluids. Fibrinogen seems to play a major role in the course of PPH and can be an early predictor of the severity of PPH. The FIBTEM values (in thromboelastometry, reagent specific for the fibrin polymerization process) decline even more rapidly than fibrinogen levels and can be useful for early guidance of interventions. Data on thromboelastography and thromboelastometry in pregnant women are limited, particularly during the peripartum period and in women with PPH, so more research in this field is needed.

**Database:** Medline

#### **43. The role of recombinant activated factor VII in obstetric hemorrhage.**

**Author(s):** Ahonen, Jouni

**Source:** Current opinion in anaesthesiology; Jun 2012; vol. 25 (no. 3); p. 309-314

**Publication Date:** Jun 2012

**Publication Type(s):** Journal Article Review

**PubMedID:** 22473215

Available at [Current opinion in anaesthesiology](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:****PURPOSE OF REVIEW**To review the literature regarding the use of recombinant activated factor FVII (rFVIIa) in the treatment of postpartum hemorrhage (PPH).**RECENT FINDINGS**The previous and recent case reports and case series suggest a potential benefit of rFVIIa in the management of severe PPH refractory to standard treatment. However, the lack of randomized controlled studies limits the value of the available data. rFVIIa cannot work optimally if there is a shortage of the basic components of the coagulation cascade such as fibrinogen. New experimental data suggest that rFVIIa can relocate into the extravascular space and remain functionally active which may prolong its hemostatic effect longer than the short circulatory half-life indicates.**SUMMARY**Although some preliminary guidelines have been published, the case reports and case series illustrate that the practice of using rFVIIa in PPH is far from uniform. rFVIIa should usually not be used to compensate for an inadequate transfusion therapy. Therefore, early and effective administration of red blood cells, fresh frozen plasma, fibrinogen concentrate (or cryoprecipitate), and platelets as well as the control of uterine atony are essential before considering administration of rFVIIa in the treatment of PPH.

**Database:** Medline



#### **44. Postpartum hemorrhage: when uterotonics and sutures fail.**

**Author(s):** James, Andra H; McLintock, Claire; Lockhart, Evelyn

**Source:** American journal of hematology; May 2012; vol. 87

**Publication Date:** May 2012

**Publication Type(s):** Journal Article Review

**PubMedID:** 22430921

Available at [American journal of hematology](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**Systemic bleeding at the time of postpartum hemorrhage (PPH) is usually the result of coagulopathy that has developed acutely as a result of massive hemorrhage after uterotonics and sutures have failed. Occasionally, the patient has a preexisting coagulopathy, but more often, coagulopathy arises acutely as the result of massive hemorrhage, which is usually related to obstetrical and less often surgical bleeding. Despite being able to identify risk factors for PPH in the antenatal and intrapartum period, the majority of women who ultimately develop PPH do not have any such factors and every pregnancy is at risk. The coagulopathy associated with massive PPH may be due to hemodilution, failure of liver synthetic function as occurs with acute liver failure of pregnancy, or disseminated intravascular coagulation (DIC). There are no data from clinical trials to help guide management of transfusion in PPH, although the management of blood component therapy in severe PPH is similar to that in other massive hemorrhage. Standard practice is to replace fibrinogen to maintain a level of  $\geq 100$  mg/dL, yet recent evidence suggests that the level of fibrinogen needed to prevent PPH is at least 400 mg/dL. Recombinant activated factor VIIa (rFVIIa) has been used in the management of severe PPH unresponsive to blood component therapy. Coagulation laboratory evaluation may be useful in guiding hemostatic management during massive PPH, but for the results to be useful, they must be rapidly available and provide information that would not be available from clinical assessment alone. The hematologist or hemostasis expert has the opportunity to make the difference between life and death for the patient experiencing massive PPH.

**Database:** Medline

#### **45. Prohemostatic interventions in obstetric hemorrhage.**

**Author(s):** Bonnet, Marie-Pierre; Basso, Olga

**Source:** Seminars in thrombosis and hemostasis; Apr 2012; vol. 38 (no. 3); p. 259-264

**Publication Date:** Apr 2012

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article Review

**PubMedID:** 22510859

**Abstract:**Obstetric hemorrhage is a major cause of maternal morbidity and mortality. Pregnancy is associated with substantial hemostatic changes, resulting in a relatively hypercoagulable state. Acquired coagulopathy can, however, develop rapidly in severe obstetric hemorrhage. Therefore, prohemostatic treatments based on high fresh frozen plasma and red blood cell (FFP:RBC) ratio transfusion and procoagulant agents (fibrinogen concentrates, recombinant activated factor VII, and tranexamic acid) are crucial aspects of management. Often, evidence from trauma patients is applied to obstetric hemorrhage management, although distinct differences exist between the two situations. Therefore, until efficacy and safety are demonstrated in obstetric hemorrhage, clinicians should be cautious about wholesale adoption of high FFP:RBC ratio products. Applications of transfusion protocols, dedicated to massive obstetric hemorrhage and multidisciplinary developed, currently remain the best available option. Similarly, while procoagulant agents appear promising in treatment of obstetric hemorrhage, caution is nonetheless warranted as long as clear evidence in the context of obstetric hemorrhage is lacking.

**Database:** Medline

#### **46. Massive obstetric haemorrhage with disseminated intravascular coagulopathy**

**Author(s):** Su L.L.; Chong Y.S.

**Source:** Best Practice and Research: Clinical Obstetrics and Gynaecology; Feb 2012; vol. 26 (no. 1); p. 77-90

**Publication Date:** Feb 2012

**Publication Type(s):** Review

**Abstract:**Massive obstetric haemorrhage is a major contributor towards maternal morbidity and mortality. The main causes are abruptio placentae, placenta praevia and postpartum haemorrhage. Clinicians managing pregnant women should be equipped with the knowledge and skills for managing massive obstetric haemorrhage to institute timely and appropriate life-saving treatment. Prompt resuscitation and reversal of coagulopathy are critical while definitive measures are carried out to arrest the bleeding. Massive antepartum haemorrhage necessitates deliveries whereas interventions for postpartum haemorrhage range from medical to surgical measures. Algorithms such as haemostasis are useful aids to the systematic and stepwise management of postpartum haemorrhage. Surgical measures used to avoid peripartum haemorrhage include uterine compression sutures, uterine balloon tamponade, uterine artery, and internal iliac artery ligation. Tranexamic acid and recombinant factor VII are more recent medical interventions in massive postpartum haemorrhage. Education, regular drills and adherence to guidelines and protocols are important to reduce haemorrhage-related maternal deaths. © 2011 Elsevier Ltd. All rights reserved.

**Database:** EMBASE

**47. Balloon tamponade during cesarean section is useful for severe post-partum hemorrhage due to placenta previa.**

**Author(s):** Ishii, Takako; Sawada, Kenjiro; Koyama, Shunsuke; Isobe, Aki; Wakabayashi, Atsuko; Takiuchi, Tsuyoshi; Kanagawa, Takeshi; Tomimatsu, Takuji; Ogita, Kazuhide; Kimura, Tadashi

**Source:** The journal of obstetrics and gynaecology research; Jan 2012; vol. 38 (no. 1); p. 102-107

**Publication Date:** Jan 2012

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article

**PubMedID:** 21827577

Available at [The journal of obstetrics and gynaecology research](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**AIM Severe post-partum hemorrhage during cesarean section due to placenta previa is still one of the leading causes of maternal mortality. The aim of this study was to evaluate the efficiency of intrauterine tamponade with a Sengstaken-Blakemore tube (SB-tube) for the treatment of severe post-partum hemorrhage in cases of placenta previa. MATERIAL AND METHOD SData were collected from our departmental clinical records on all patients who underwent caesarian section due to placenta previa between 2007 and 2009. RESULT SDuring the period analyzed, 37 patients underwent caesarian section due to placenta previa/low-lying placenta. Four (11%) underwent hysterectomy due to placenta accreta and 33 (89%) were treated conservatively. Of the 33 patients with conserved uterus, 10 (28%) patients required a SB-tube during the cesarean section because of continuous post-partum hemorrhage despite appropriate medical treatment. The median bleeding during the operation was  $2030 \pm 860$  mL in the patients who used SB-tube. None of them presented severe complications related to these procedures or required any further invasive surgery. CONCLUSION Intrauterine balloon-tamponade could successfully control severe hemorrhage from a lower uterine segment of a patient with placenta previa. This technique is simple to use, scarcely invasive, and available at a low cost to all maternity wards, and should be considered as one of the first management options to reduce the risk of undesirable hysterectomy.

**Database:** Medline

#### **48. Operative interventions in the management of major postpartum haemorrhage.**

**Author(s):** Keriakos, R; Chaudhuri, S

**Source:** Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology; Jan 2012; vol. 32 (no. 1); p. 14-25

**Publication Date:** Jan 2012

**Publication Type(s):** Journal Article

**PubMedID:** 22185528

**Abstract:**In many recent studies in the developed world, the incidence of postpartum haemorrhage (PPH) has been rising, though the mortality has come down, suggesting improvement in the management of this condition. Since the publication of the RCOG guidelines in 2009 for management of PPH and the Sheffield guidelines for the use of Rusch balloon along with the initial small case series (Keriakos and Mukhopadhyay 2006), many units have introduced the guidelines into clinical practice. This has led to the reduction of surgical intervention in our unit. Major PPH accounted for 1.6% of the total deliveries in our hospital. Surgical interventions accounted for 7.8% of these cases and only 0.1% of the total deliveries. Risk factors for PPH were identified in 83%. In this paper, we reviewed the management of all patients who had major PPH and failed medical management over a period of about 4 years. All surgical interventions including Rusch balloon, B-Lynch suture, radiological interventions and hysterectomy were described. An update to Rusch balloon guidelines and Sheffield guidelines for management of major PPH are appended.

**Database:** Medline

#### **49. Transfusion practice in major obstetric haemorrhage: lessons from trauma.**

**Author(s):** Saule, I; Hawkins, N

**Source:** International journal of obstetric anesthesia; Jan 2012; vol. 21 (no. 1); p. 79-83

**Publication Date:** Jan 2012

**Publication Type(s):** Case Reports Journal Article

**PubMedID:** 22119633

**Abstract:**The management of massive haemorrhage with blood products is changing as evidence arrives from civilian and military trauma. Rapid early replacement of coagulation factors and platelets is now becoming central to improving outcome, usually given in higher ratios with respect to red cell units than previously recommended and using empiric transfusion based on clinical rather than laboratory parameters. The management of three cases of major obstetric haemorrhage based on these principles is presented. Packed red blood cells, fresh frozen plasma, platelets and cryoprecipitate were transfused in the ratios 5:2:2:1, 4.5:1:1:1 and 4.5:2:1:1. Each patient had acceptable full blood count and coagulation results after surgery and all made an uneventful recovery. These outcomes support the opinion that major obstetric haemorrhage can be managed in a similar fashion to blood loss in trauma. Recommendations from the Association of Anaesthetists of Great Britain and Ireland, and the UK National Patient Safety Agency should be considered during major obstetric haemorrhage.

**Database:** Medline

**50. Recombinant activated factor VII (rFVIIa/NovoSeven®) in the management of severe postpartum haemorrhage: initial report of a multicentre case series in Japan.**

**Author(s):** Kobayashi, Takao; Nakabayashi, Masao; Yoshioka, Akira; Maeda, Makoto; Ikenoue, Tsuyomu

**Source:** International journal of hematology; Jan 2012; vol. 95 (no. 1); p. 57-63

**Publication Date:** Jan 2012

**Publication Type(s):** Case Reports Journal Article

**PubMedID:** 22160834

Available at [International journal of hematology](#) - from SpringerLink

Available at [International journal of hematology](#) - from ProQuest (Hospital Premium Collection) - NHS Version

**Abstract:**Only a limited number of case reports documenting the off-label use of recombinant factor VIIa (rFVIIa) in Japanese patients with postpartum haemorrhage (PPH) have been published. Data on Japanese cases with severe PPH in which rFVIIa was administered were collected. Data of obstetric haemorrhage patients treated with rFVIIa between 2005 and 2010 were retrospectively collected throughout Japan. The data included patients' background information, blood product requirements, dose/timing of rFVIIa, and adverse effects. Treating clinicians subjectively assessed the effect of rFVIIa on bleeding at each administration using four categories: "Stopped", "Decreased", "Unchanged", and "Increased". A total of 25 women received rFVIIa for the treatment of obstetric haemorrhage in 18 institutions. After the final administration, bleeding was "stopped" in 16 patients (64%), "decreased" in eight patients (32%), and "unchanged" in one patient (4%). A significant reduction in blood product requirement was observed following the first rFVIIa administration. Hysterectomy was required in two patients (15.4%) after rFVIIa administration. Four asymptomatic thrombotic events were reported in three patients. These results suggest that rFVIIa can be a beneficial therapeutic option that can reduce blood loss and prevent hysterectomy in Japanese patients with massive obstetric bleeding.

**Database:** Medline

**51. Monitoring transfusion requirements in major obstetric haemorrhage: out with the old and in with the new?**

**Author(s):** Stocks, Gary

**Source:** International journal of obstetric anesthesia; Oct 2011; vol. 20 (no. 4); p. 275-278

**Publication Date:** Oct 2011

**Publication Type(s):** Editorial

**PubMedID:** 21840203

**Database:** Medline

## **52. Obstetric hemorrhage.**

**Author(s):** McIntock, C; James, A H

**Source:** Journal of thrombosis and haemostasis : JTH; Aug 2011; vol. 9 (no. 8); p. 1441-1451

**Publication Date:** Aug 2011

**Publication Type(s):** Journal Article Review

**PubMedID:** 21668737

Available at [Journal of thrombosis and haemostasis : JTH](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**An obstetric hemorrhage may occur before or after delivery, but more than 80% of cases occur postpartum. Worldwide, a massive obstetric hemorrhage, resulting from the failure of normal obstetrical, surgical and/or systemic hemostasis, is responsible for 25% of the estimated 358,000 maternal deaths each year. Most women will not have identifiable risk factors. Nonetheless, primary prevention of a postpartum hemorrhage (PPH) begins with an assessment of identifiable risk factors. Women identified as being at high risk of a PPH should be delivered in a center with access to adequately trained staff and an onsite blood bank. A critical feature of a massive hemorrhage in obstetrics is the development of disseminated intravascular coagulation (DIC), which, in contrast to DIC that develops with hemorrhage from surgery or trauma, is frequently an early feature. Data from clinical trials to guide management of transfusion in PPH are lacking. There are likely to be similarities in the management of transfusion in severe PPH to that of major bleeding in other clinical situations, but the pathophysiological processes that contribute to a massive PPH may necessitate different transfusion strategies such as the ratio of red blood cells to plasma components, in particular fibrinogen. Caution should be exercised when considering the appropriate place for recombinant activated factor VII (rFVIIa) in the management of a major PPH. An early hysterectomy is recommended for severe bleeding as a result of placenta accreta or uterine rupture. However, in women with uterine atony who have ongoing bleeding in spite of an adequate transfusion, it may be reasonable to consider a trial of rFVIIa before a hysterectomy.

**Database:** Medline

### **53. Outcome of the management of massive postpartum hemorrhage using the algorithm "HEMOSTASIS"**

**Author(s):** Varatharajan L.; Chandraharan E.; Sutton J.; Lowe V.; Arulkumaran S.

**Source:** International Journal of Gynecology and Obstetrics; May 2011; vol. 113 (no. 2); p. 152-154

**Publication Date:** May 2011

**Publication Type(s):** Article

**PubMedID:** 21396642

Available at [International Journal of Gynecology and Obstetrics](#) - from Wiley Online Library  
Medicine and Nursing Collection 2017 - NHS

**Abstract:**Objective: To evaluate whether the algorithm "HEMOSTASIS" (help; establish etiology; massage the uterus; oxytocin infusion and prostaglandins; shift to operating theater; tamponade test; apply compression sutures; systematic pelvic devascularization; interventional radiology; subtotal/total abdominal hysterectomy) was of value in the systematic management of postpartum hemorrhage (PPH). Methods: A retrospective analysis was performed of all women who experienced massive primary PPH (blood loss > 1500 mL) in 2008 at St George's Hospital, London, UK. The success of the HEMOSTASIS mnemonic in PPH management was determined by assessing clinical outcome following adherence to the protocol. Results: Patient notes were available for 95 (83.3%) of the 114 cases of primary PPH. Hemostasis was achieved in 63 (66.3%) women via use of additional oxytocics ("O"); 19 (20.0%) via suture of tears and 10 (10.5%) via tamponade ("T"); 1 (1.1%) via application of compression suture ("A"); 1 (1.1%) via systematic devascularization ("S"); and 1 (1.1%) via subtotal/total hysterectomy ("S"). There were no maternal deaths. Conclusion: The decremental pattern of more complex interventions used demonstrates that the algorithm can provide a logical management pathway to reduce blood transfusions, hysterectomies, admissions to intensive care units, and maternal deaths. Crown Copyright © 2011 Published by Elsevier Ireland Ltd. on behalf of International Federation of Gynecology and Obstetrics. All rights reserved.

**Database:** EMBASE

#### **54. Standard haemostatic tests following major obstetric haemorrhage.**

**Author(s):** de Lloyd, L; Bovington, R; Kaye, A; Collis, R E; Rayment, R; Sanders, J; Rees, A; Collins, P W

**Source:** International journal of obstetric anesthesia; Apr 2011; vol. 20 (no. 2); p. 135-141

**Publication Date:** Apr 2011

**Publication Type(s):** Journal Article

**PubMedID:** 21439811

**Abstract:**BACKGROUND Postpartum haemorrhage is an important cause of maternal morbidity and mortality. It is associated with haemostatic impairment which may exacerbate bleeding.METHODSAll deliveries over a 3-year period in a large UK unit were reviewed and cases of haemorrhage of 1500 mL or more identified. Laboratory records were reviewed and the lowest value for haemoglobin, platelet count and fibrinogen, and longest value for prothrombin time and activated partial thromboplastin time within 24h of delivery were recorded.RESULTSO f 18,501 deliveries there were 456 bleeds of 1500 mL or more (2.5%). Fibrinogen levels correlated best with blood loss ( $r = -0.48$   $P < 0.01$ ) and fell progressively as volume increased. Activated partial thromboplastin time was less sensitive ( $r = 0.4$   $P < 0.01$ ) to increasing blood loss. Prothrombin time did not correlate with blood loss ( $r = 0.01$ ). Activated partial thromboplastin time and prothrombin time remained within the normal range in most women despite large bleeds. Similar results were observed in women who received four or more units of red blood cells. Haemoglobin level was adequately maintained irrespective of blood loss. Based on UK national guidelines only 13 of 456 (3%) women should have received fresh frozen plasma, although it was given to 45; despite this, fibrinogen levels below the pregnancy-related normal range were observed in most cases.CONCLUSIONFibrinogen level was the parameter that best correlated with increasing volume of haemorrhage and was the most useful marker of developing haemostatic impairment. Guidelines for fresh frozen plasma use in major postpartum haemorrhage were rarely followed and should be reviewed.

**Database:** Medline



### **55. Pelvic arterial ligations for severe post-partum hemorrhage. Indications and techniques**

**Author(s):** Morel O.; Malartic C.; Muhlstein J.; Gayat E.; Judlin P.; Soyer P.; Barranger E.

**Source:** Journal of visceral surgery; Apr 2011; vol. 148 (no. 2)

**Publication Date:** Apr 2011

**Publication Type(s):** Review

**PubMedID:** 21474415

**Abstract:**In cases of serious bleeding postpartum, resuscitation and surgical techniques are complementary and should be adapted to both the etiology and severity of bleeding. In extremely severe cases, the performance of a hysterectomy should not be delayed. For women with stable hemodynamic status, so-called "conservative" surgical techniques can instead be used. In this study, we describe and discuss the indications and feasibility of various techniques of vascular ligation. Uterine mattress suture compression techniques and abdomino-pelvic packing are also described. When conservative management is feasible, the first line approach should be bilateral distal ligation of the uterine arteries: this simple and low-risk technique is immediately effective in 80% of cases. If bleeding persists, uterine devascularization can be completed by a triple ligation as described by Tsurunikov, with or without supplemental proximal ligation of the uterine arteries. This procedure should be performed in preference to the so-called "stepwise ligation sequence", which involves ligation of the ovarian pedicles and poses a risk of subsequent ovarian failure. Bilateral hypogastric artery ligation is also an effective and widely used first-line technique for experienced surgeons. This approach is technically challenging for less-experienced surgeons and is reserved for cases of failed triple ligation. Copyright © 2011 Elsevier Masson SAS. All rights reserved.

**Database:** EMBASE

### **56. Uterine compression sutures for the management of severe postpartum hemorrhage.**

**Author(s):** Kayem, Gilles; Kurinczuk, Jennifer J; Alfirevic, Zarko; Spark, Patsy; Brocklehurst, Peter; Knight, Marian; U.K. Obstetric Surveillance System (UKOSS)

**Source:** Obstetrics and gynecology; Jan 2011; vol. 117 (no. 1); p. 14-20

**Publication Date:** Jan 2011

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article

**PubMedID:** 21213474

Available at [Obstetrics and gynecology](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:****OBJECTIVE**To assess maternal outcomes after uterine compression suture use and to characterize the risk factors for failure, defined as cases that proceeded to hysterectomy.**METHODS**A prospective population-based study of 1.2 million women delivering was conducted using the U.K. Obstetric Surveillance System to identify all women in the United Kingdom delivering between September 2007 and March 2009 and treated with uterine compression sutures.**RESULTS**Two hundred eleven women were treated with a uterine compression suture to control postpartum hemorrhage. The overall rate of failure, leading to hysterectomy, was 25% (95% confidence interval, 19–31%); there were no significant differences in failure rates among B-Lynch sutures, modified B-Lynch sutures, and other suture techniques. Women were more likely to have a hysterectomy if they were aged 35 years or older (33% compared with 20% aged younger than 35 years), multiparous (33% compared with 14% in nulliparous), in unemployed and routine or manual occupational groups (28% compared with 17% in managerial or professional groups), had a vaginal delivery (47% compared with 22% in the cesarean delivery group), or a delay of between 2 and 6 hours from delivery to uterine suture compression (42% compared with 16% with delay less than 1

hour).CONCLUSIONA prolonged delay of 2–6 hours between delivery and uterine compression suture was independently associated with a fourfold increase in the odds of hysterectomy. These data emphasize the need for a careful evaluation of blood loss after delivery to avoid any prolonged delay in recognition of hemorrhage.LEVEL OF EVIDENCEIII

**Database:** Medline

## **57. Challenges of major obstetric haemorrhage.**

**Author(s):** Wise, Arlene; Clark, Vicki

**Source:** Best practice & research. Clinical obstetrics & gynaecology; Jun 2010; vol. 24 (no. 3); p. 353-365

**Publication Date:** Jun 2010

**Publication Type(s):** Journal Article Review

**PubMedID:** 20110196

**Abstract:**Every minute of every day, a woman dies in pregnancy or childbirth. The biggest killer is obstetric haemorrhage, the successful treatment of which is a challenge for both the developed and developing worlds. The presence of an attendant at every birth and access to emergency obstetric care are key to reducing maternal morbidity and mortality in the developing world while resource-rich countries have a rising caesarean section rate with its consequential effect on the incidence of abnormal placentation and its link with peripartum hysterectomy. Management of obstetric haemorrhage involves early recognition, assessment and resuscitation. Various methods are available to try to stop the bleeding - from pharmacological methods to aid uterine contraction (e.g., oxytocin, ergometrine and prostaglandins) to surgical methods to stem the bleeding (e.g., balloon tamponade, compression sutures or arterial ligation). Interventional radiology can be used if placenta accreta is suspected. Cell salvage has been introduced into obstetrics relatively recently in an attempt to reduce allogeneic transfusion.

**Database:** Medline

**58. Uterine compression sutures for preserving fertility in severe postpartum haemorrhage: An overview 13 years after the first description**

**Author(s):** Fotopoulou C.; Dudenhausen J.W.

**Source:** Journal of Obstetrics and Gynaecology; May 2010; vol. 30 (no. 4); p. 339-349

**Publication Date:** May 2010

**Publication Type(s):** Review

**PubMedID:** 20455714

**Abstract:**We performed a systematic review of the current literature on efficacy, complications and impact on future pregnancies of uterine compression sutures (UCS) applied in cases of severe postpartum haemorrhage (PPH) in women who wish to preserve fertility. Publications related to UCS from their initial description 03/199607/2009, were identified using PubMed and EMBASE.

Numerous case series have demonstrated the high efficiency of UCS against PPH. When performed correctly, they are associated with a low complications rate. A higher risk of uterine ischaemia seems to be caused when combined with vessel ligation. No negative impact on fertility has been reported. Uncomplicated future pregnancies occur within a range of 1-3 years. UCS appear safe, simple to learn and preserve future reproductive potential. They should be considered prior to definite measures like hysterectomy in severe PPH. Long-term follow-up is recommended when additional combined vessel ligation is performed due to the potential risk of ischaemic necrosis. © 2010 Informa Healthcare USA, Inc.

**Database:** EMBASE

**59. Surgical remedies for postpartum hemorrhage.**

**Author(s):** Porreco, Richard P; Stettler, Robert W

**Source:** Clinical obstetrics and gynecology; Mar 2010; vol. 53 (no. 1); p. 182-195

**Publication Date:** Mar 2010

**Publication Type(s):** Journal Article Review

**PubMedID:** 20142655

Available at [Clinical obstetrics and gynecology](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:**When medical therapy is unsuccessful, surgical approaches to postpartum hemorrhage are often considered. These may include uterine curettage, laceration repair, balloon tamponade, compressive suture techniques, uterine or hypogastric artery ligation, and ultimately hysterectomy. A systems approach to the care of these patients includes identification of rapid response teams, assessment of risk factors, and the timely and knowledgeable use of blood and blood products. Comprehensive care of patients with massive obstetric hemorrhage will improve the outcome of this largely preventable cause of maternal mortality.

**Database:** Medline

## **60. Blood product replacement for postpartum hemorrhage.**

**Author(s):** Fuller, Andrea J; Bucklin, Brenda A

**Source:** Clinical obstetrics and gynecology; Mar 2010; vol. 53 (no. 1); p. 196-208

**Publication Date:** Mar 2010

**Publication Type(s):** Journal Article Review

**PubMedID:** 20142656

Available at [Clinical obstetrics and gynecology](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:**Hemorrhage requiring blood transfusion is a common occurrence in obstetrics. This article reviews each step in the transfusion process, including laboratory preparation of blood, indications for various blood components, complications of blood transfusion, massive transfusion, and alternatives to homologous blood. Current thinking regarding transfusion-related acute lung injury, transfusion-related immunomodulation, early use of plasma for massive transfusion, and the use of adjuvant agents such as activated recombinant factor VII are also discussed.

**Database:** Medline

## **61. Strategies to manage major obstetric haemorrhage.**

**Author(s):** Wise, Arlene; Clark, Vicki

**Source:** Current opinion in anaesthesiology; Jun 2008; vol. 21 (no. 3); p. 281-287

**Publication Date:** Jun 2008

**Publication Type(s):** Journal Article Review

**PubMedID:** 18458542

)

Available at [Current opinion in anaesthesiology](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:**PURPOSE OF REVIEWHaemorrhage remains a cause of significant maternal morbidity and mortality. This review summarizes the prevention, management and treatment of obstetric haemorrhage and highlights recent advances and developments.RECENT FINDINGSPostpartum haemorrhage is the most common cause of major obstetric haemorrhage and is usually due to uterine atony. Pharmacological treatment has not altered much in recent years with oxytocin and ergometrine remaining first-line options. Although controversy surrounds its advantages over other uterotonics, the use of misoprostol has been increasing, especially in resource-poor countries. Placenta accreta is becoming more common, a sequelae to the rising caesarean section rate. Interventional radiology may reduce blood loss in these cases. Uterine compression sutures, intrauterine tamponade balloons and cell salvage have all made their debut in the last decade.SUMMARYAccurate diagnosis and appropriate management of obstetric haemorrhage can reduce maternal morbidity and mortality. This review outlines the current evidence.

**Database:** Medline

## **62. Fertility and pregnancy outcomes following uterine devascularization for severe postpartum haemorrhage.**

**Author(s):** Sentilhes, Loïc; Trichot, Caroline; Resch, Benoît; Sergent, Fabrice; Roman, Horace; Marpeau, Loïc; Verspyck, Eric

**Source:** Human reproduction (Oxford, England); May 2008; vol. 23 (no. 5); p. 1087-1092

**Publication Date:** May 2008

**Publication Type(s):** Journal Article

**PubMedID:** 18321892

Available at [Human reproduction \(Oxford, England\)](#) - from Oxford Journals - Medicine

**Abstract:**BACKGROUND To evaluate the fertility and pregnancy outcomes following uterine devascularization for postpartum haemorrhage (PPH).METHODS All patients who required uterine devascularization, i.e. bilateral uterine artery ligation (Group A), and either bilateral utero-ovarian ligament (Group B) or suspensory ligament of ovary ligation (Group C) in cases of persistent haemorrhage, for PPH with no concomitant procedures from December 1997 to March 2004 were included. Data were retrieved from medical files and telephone interviews.RESULTS Data were available for 32 of the 40 (80%) patients included in the study. All patients but 4 had a return to normal menses. Postpartum amenorrhea was secondary to ovarian failure in two cases, and synechiae or necrotic uterus each in one case. These four patients belonged to Group C, whereas no adverse events were observed in groups A and B. Thirteen patients had 16 pregnancies with 13 term deliveries, 1 ectopic pregnancy and 2 abortions. Clinical course of the 13 complete gestations were uneventful but PPH recurred in 4 (31%) due to placenta accreta in three cases.CONCLUSIONS Uterine artery ligation, whether or not associated with utero-ovarian ligament ligation, for PPH does not appear to compromise the patients' subsequent fertility and obstetrical outcome.

**Database:** Medline

## **63. Use of recombinant factor VIIa in massive post-partum haemorrhage.**

**Author(s):** McMorrow, R C N; Ryan, S M; Blunnie, W P; Bowen, M; Carton, E G; Gardiner, J; Geary, M; Loughrey, J P R

**Source:** European journal of anaesthesiology; Apr 2008; vol. 25 (no. 4); p. 293-298

**Publication Date:** Apr 2008

**Publication Type(s):** Journal Article

**PubMedID:** 18177539

Available at [European journal of anaesthesiology](#) - from Ovid (LWW Total Access Collection 2015 - Q1 with Neurology)

**Abstract:**BACKGROUND AND OBJECTIVE Massive post-partum haemorrhage continues to be one of the world's leading causes of maternal morbidity and mortality. Any new treatment that potentially helps at risk parturients should be thoroughly investigated. Recombinant factor VIIa (rVIIa) is increasingly being used in the treatment of massive haemorrhage. We performed a case-matched analysis of its use since 2003 in the treatment of massive post-partum haemorrhage at our hospital.METHODS Twenty-eight cases of massive post-partum haemorrhage were identified over a 3-yr period since 2003. In six of these cases, rVIIa was used as part of their management. Six case-matched controls were sought. The six women with the greatest requirement for packed red cell transfusion who also had a deranged prothrombin time were included. The groups were then compared for differences. The worst prothrombin time in each group was noted as was the best prothrombin time within 6 h, this was used as our measure of response to treatment.RESULTS There was no statistical difference in age, gestation, parity, transfusion requirements, mode of delivery or

the severity of the coagulopathy between the two groups. In both groups the prothrombin time improved with management. There was no significant difference in either the magnitude of the improvement in the value of the prothrombin time or the absolute value of the best prothrombin time ( $P = 0.09$ ). Five out of the six women in the rFVIIa group had normal or low prothrombin times within 6 h yet only one woman who did not receive rFVIIa had a normal prothrombin time within 6 h though this was not significant ( $P = 0.08$ ). **CONCLUSION** This case-matched analysis supports the management of massive post-partum haemorrhage with appropriate resuscitation, surgical intervention and use of blood and blood products. This study does not support the routine use of rFVIIa in the management of massive obstetric haemorrhage. rFVIIa may have a role to play in this management but further studies and analyses will be required.

**Database:** Medline

#### **64. Major obstetric hemorrhage.**

**Author(s):** Mercier, Frederic J; Van de Velde, Marc

**Source:** Anesthesiology clinics; Mar 2008; vol. 26 (no. 1); p. 53-67

**Publication Date:** Mar 2008

**Publication Type(s):** Journal Article Review

**PubMedID:** 18319179

**Abstract:** Major obstetric hemorrhage remains the leading cause of maternal mortality and morbidity worldwide, and is associated with a high rate of substandard care. A well-defined and multidisciplinary approach that aims to act quickly and avoid omissions or conflicting strategies is key. The most common etiologies of hemorrhage are abruptio placenta, placenta previa/accreta, uterine rupture in the antepartum period and retained placenta, uterine atony, and genital-tract trauma in the postpartum period. Basic treatment of postpartum hemorrhage relies on manual removal of the placenta or manual exploration of the uterus plus bladder emptying and oxytocin administration. If this does not arrest bleeding, or if there is any suspicion of genital-tract trauma, examination of the vagina and cervix with appropriate valves and analgesia/anesthesia must follow quickly. Postpartum uterine atony resistant to oxytocin must be treated with prostaglandin within 15 to 30 minutes; uterine balloon tamponade can be also useful at this stage. Aggressive transfusion therapy and resuscitation are mandatory in major obstetric hemorrhage. Specific invasive treatment must be considered within no more than 30 to 60 minutes, if previous measures have failed -- and even earlier in some particular etiologies. The two main options are radiologic embolization and surgical artery ligations. Recombinant factor VIIa may also be considered, but should not delay the performance of a life-saving procedure such as embolization or surgery. Hysterectomy must be implemented when all other interventions have failed.

**Database:** Medline

**65. Guidelines for the use of recombinant activated factor VII in massive obstetric haemorrhage.**

**Author(s):** Welsh, Alec; McLintock, Claire; Gatt, Stephen; Somerset, David; Popham, Phillip; Ogle, Robert

**Source:** The Australian & New Zealand journal of obstetrics & gynaecology; Feb 2008; vol. 48 (no. 1); p. 12-16

**Publication Date:** Feb 2008

**Publication Type(s):** Practice Guideline Journal Article

**PubMedID:** 18275566

Available at [The Australian & New Zealand journal of obstetrics & gynaecology](#) - from Wiley Online Library Medicine and Nursing Collection 2017 - NHS

**Abstract:**Recombinant activated factor VII (rFVIIa) is emerging as a novel therapy for the treatment of life or fertility-threatening post-partum haemorrhage (PPH) unresponsive to standard therapy that in some cases may prevent the need for peripartum hysterectomy. The level of evidence to date for use of rFVIIa in PPH is limited to case reports and case series with one nonrandomised study. No high-quality randomised controlled trials have been published at this stage, precluding a quality systematic review. Guidelines have been published for the use of rFVIIa in non-obstetric haemorrhage, though to date none are available for PPH. A multidisciplinary group of Australian and New Zealand clinicians from the fields of obstetrics, anaesthesia and haematology, who have both clinical experience in and/or knowledge of rFVIIa was convened by the manufacturer. This group produced an opinion and guideline based on their experience and the published international literature on the use of rFVIIa. This is intended to be used as a guideline and algorithm for the use of rFVIIa, though any use should be tailored to local practice and resources.

**Database:** Medline

## Strategy 294030

#	Database	Search term	Results
1	Medline	("massive obstetric* haemorrhage").ti,ab	51
2	Medline	("massive obstetric* hemorrhage").ti,ab	50
3	Medline	("massive hemorrhage").ti,ab	2117
4	Medline	("massive haemorrhage").ti,ab	478
5	Medline	(obstetric* OR labour OR labor OR pregn* OR maternal).ti,ab	632927
6	Medline	exp "OBSTETRIC LABOR COMPLICATIONS"/	61528
7	Medline	exp "PREGNANCY COMPLICATIONS"/	389814
8	Medline	(3 OR 4)	2590
9	Medline	(5 OR 6 OR 7)	798217
10	Medline	(8 AND 9)	293
11	Medline	(1 OR 2 OR 10)	381
12	Medline	("major obstetric* haemorrhage").ti,ab	59
13	Medline	("major obstetric* hemorrhage").ti,ab	17
14	Medline	("major hemorrhage").ti,ab	694
15	Medline	("major haemorrhage").ti,ab	276
16	Medline	(14 OR 15)	970
17	Medline	(8 AND 16)	14
18	Medline	(11 OR 12 OR 13 OR 17)	463



19	Medline	(massive OR major OR severe).ti	226515
21	Medline	exp "POSTPARTUM HEMORRHAGE"/ OR exp "UTERINE HEMORRHAGE"/	19581
22	Medline	(19 AND 21)	753
23	EMBASE	("massive obstetric* haemorrhage").ti,ab	142
24	EMBASE	("major obstetric* haemorrhage").ti,ab	177
25	EMBASE	("major obstetric* hemorrhage").ti,ab	35
26	EMBASE	exp "OBSTETRIC HEMORRHAGE"/	14233
27	EMBASE	(massive OR major OR severe).ti	284574
28	EMBASE	(26 AND 27)	1077
29	EMBASE	(23 OR 24 OR 25 OR 28)	1247
30	EMBASE	29 [Publication types Review] [Languages English]	69
31	EMBASE	29 [DT FROM 2007] [English language]	875
32	EMBASE	*"OBSTETRIC HEMORRHAGE"/ OR *"ANTEPARTUM HEMORRHAGE"/ OR *"INTRAPARTUM HEMORRHAGE"/ OR *"POSTPARTUM HEMORRHAGE"/	5347
33	EMBASE	(27 AND 32)	723
34	EMBASE	33 [DT FROM 2007] [English language]	447

35	EMBASE	(massive OR major OR severe).ti,ab	2651993
36	EMBASE	(26 AND 35)	4087
37	EMBASE	(32 AND 35)	1762
38	EMBASE	37 [DT FROM 2007] [Publication types Review] [English language]	125
39	Medline	(massive OR major OR severe).ti,ab	1984804
40	Medline	(21 AND 39)	2627
41	Medline	40 [Document type Review] [Languages English]	356