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Managing major obstetric haemorrhage: Pharmacotherapy and transfusion

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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.

The incidence of post-partum haemorrhage (PPH) has increased in recent years in many developed countries, including the United Kingdom (UK), Canada, Australia and the United States (US). This trend has also been noted in South Africa [1,2]. The reasons are not fully understood, but the increase in the

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use of oxytocin for the induction and augmentation of labour and the increasing primary and repeat caesarean delivery rate may contribute to the increase of PPH [3].

Definition of major obstetric haemorrhage

Postpartum haemorrhage is usually defined as the loss of more than 500 mL of blood after vaginal delivery and 1000 mL of blood after caesarean delivery. These amounts are exceeded in 1:20 deliveries [4]. Massive haemorrhage (MOH) is defined as the loss of more than 2500 mL of blood and is associated with significant morbidity, including the need for obstetric hysterectomy and critical care. Other definitions of MOH include a fall in haemoglobin to $\geq$4 g/dL, the need for transfusion of $\geq$5 units of packed red blood cells (RBCs), or the need to treat coagulopathy or perform an invasive procedure. The incidence of MOH is approximately 6:1000 deliveries [1]. In the latest mortality reports, MOH was one of the leading causes of maternal mortality, contributing to approximately 50% of maternal deaths worldwide [5]; in the UK, it accounts for approximately 10% of all direct deaths [6]. Maternal deaths from primary PPH in France are two times higher than those in the Netherlands and four times higher than those in the UK [7–11]. In the period spanning from 2009 to 2012, in the UK and Ireland, there were 17 deaths by MOH, with an incidence of 0.49 per 100,000 maternities, and a case fatality rate of 1:1200 women. Currently, MOH is the third leading direct cause of maternal deaths. Many of these deaths are considered potentially avoidable [6]. The main recommendations of 'Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK)' are described in Table 1.

Management of PPH

Blood loss in a maternity setting may be rapid and readily apparent, intermittent and difficult to quantify, or completely concealed. In all cases, without prompt attention, the mother may become critically and dangerously hypovolemic, leading to cardiovascular collapse. Because of physiological adaptations in pregnancy, women may show few cardiovascular signs until 30%–50% of the circulating blood volume has been lost. Delayed treatment may lead to significant end-organ damage, coagulopathy and even death. Early identification and treatment are highlighted in the current UK Royal College of Obstetricians and Gynaecologist Green-top guidelines, which recommend that with a blood loss of 500–1000 mL, clinicians should undertake 'basic measures of monitoring' and 'readiness for resuscitation,' and after more than 1000 mL, a 'full protocol … to resuscitate, monitor and arrest bleeding' should be employed. The major problem, however, is early identification of women who may be bleeding [4].

In a large PPH preparedness survey, the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) PPH Project, in the US performed in 2013–2014, large variations were identified in

Table 1
Recommendations for treatment of obstetric haemorrhage from 'Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK)'.

Diagnose and optimise anaemia before delivery.
Early and systematic use of observational physiological scales, e.g. the Modified Early Obstetric Warning Score (MEOWS).
Early referral to the most experienced clinicians.
Fluid resuscitation and blood transfusion after assessment of the overall situation, including but not limited to haemoglobin levels.
Paradoxical bradycardia may be observed; hypotension is usually a late sign.
Early treatment of coagulopathy, especially in high-risk patients.
Early consideration of surgical haemostasis if pharmacologic measures fail.
Early consideration of hysterectomy if the surgical and medical measures fail.
Stimulation or induction of uterine contractions should follow strict protocols to avoid uterine tachysystole.

Adapted from Knight M, Kenyon S, Brockle-hurst P, Neilson J, Shakespeare J, Kurinczuk JJ, editors. Saving lives, improving mothers' care. Lessons learned to inform future maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009–2012. Oxford: National Perinatal Epidemiology Unit, University of Oxford; 2014. Available in: https://www.npeu. ox.ac.uk/mbrrace-uk/reports. Accessed January 8, 2017.