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View in Article Scopus (3) Crossref Google Scholar Management of MOH requires a multidisciplinary team approach which should be practiced regularly. Early transfusion of blood and blood products reduced incidence and severity of coagulopathy. Point of care testing of coagulation is recommended to allow rational use of products. Major obstetric haemorrhage (MOH) remains a challenge for anaesthetists and obstetricians. It is testament to improved management that despite an incidence of 1 per 270 deliveries in the UK, mortality has decreased to 1 g litre⁻¹ and platelets (>20×10⁹ litre⁻¹). Evidence for its use is limited, and concerns remain regarding increased risk of thrombosis and lack of effect, in the face of major haemorrhage. Factor VIIa may be acceptable to Jehovah's Witnesses. Treatment goals transfusion for massive haemorrhage used by the UK military 10 provide useful guidelines for patients with MOH: • Hct >0.3 • Plt >100×10⁹ litre⁻¹ • Fibrinogen >2 g litre⁻¹ • Ionized Ca >1 • Temp. >36°C. Uterotonics When post-partum uterine bleeding occurs, uterine massage and bimanual compression may be enough to halt bleeding or buy time. Several drugs are available to treat bleeding from uterine atony: Syntocinon used prophylactically in the third stage of labour reduces the risk of PPH by 60%. 7 Syntocinon causes vascular smooth muscle relaxation which can cause hypotension with a reflex tachycardia. This may occur particularly if syntocinon is given as a bolus. This bolus should not exceed 5 units i.v., which may be repeated and should always be given slowly. This is commonly followed by an infusion at 10 units h⁻¹. Some authorities caution against its use altogether in the presence of a compromised CVS or if it cannot be avoided, recommend the use of a dilute solution. syntocinon—synthetic oxytocin, ergometrine—an ergot alkaloid, carboprost—a prostaglandin, misoprostol—a synthetic prostaglandin E1 analogue. Ergometrine is recommended as a second-line uterotonic, which acts on uterine and other smooth muscle. It may cause diarrhoea, nausea, and vomiting and is contra-indicated in pre-eclampsia or other hypertensive conditions as it may provoke prolonged severe hypertension (the duration of action is ~3 h after i.m. dose). Ergometrine can be given i.v., but the risk of severe adverse reactions is increased. It is recommended for i.m. use (500 µg) or slow i.v. (250–500 µg) use in a life-threatening emergency. Carboprost is a third-line uterotonic also given by i.m. injection; it is not licensed for intra-uterine injection. Two hundred and fifty micrograms i.m. may be given at 15 min intervals to a maximum of 2 mg. It may precipitate bronchospasm and is contra-indicated in asthmatics. Misoprostol is active via rectal, sublingual, and oral routes and thus can be used before i.v. access has been obtained. The dose is 400 µg to 1 mg. It is inexpensive, does not need refrigeration, and is therefore useful in resource away from the hospital setting. Anaesthetic technique Regional anaesthesia is associated with decreased blood loss during elective Caesarean section for placenta praevia. 11 If major blood loss is anticipated, the patient should be counselled about the possibility of rapid conversion to general anaesthesia. In the patient with a potentially difficult airway, general anaesthesia from the outset may be a safer option for elective surgery. In an emergency with a cardiovascularly unstable patient requiring surgery, general anaesthesia usually indicated. In the presence of known or suspected coagulopathy, there is no place for the establishment of regional anaesthesia. If a cardiovascularly stable patient has ongoing bleeding, the technique should be chosen after careful consideration of the risks. Arterial and central venous cannulation allows continuous arterial pressure monitoring, repeat blood sampling, and infusion of vasopressors. If haemorrhage is anticipated, there should be a low threshold for siting invasive monitoring before surgery. Surgical and other interventions Intra-uterine balloon tamponade and compression sutures have both been shown to control haemorrhage and avoid the need for hysterectomy. 12 Intra-uterine balloon tamponade Uterine compression sutures Interventional radiology (IR) (intra-arterial balloon occlusion and arterial embolization) Pelvic vessel ligation (internal iliac, uterine, hypogastric, or ovarian arteries). IR intra-arterial balloons may be placed prophylactically. The balloons can be inflated after delivery while the bleeding is controlled. In ongoing haemorrhage, IR may be used to embolize arteries. Such techniques may help preserve fertility and halt haemorrhage but are only available in a limited number of institutions. In the UK, only 29% of units have 24 h availability. 13 Hysterectomy should be discussed with patients in whom MOH is predicted (e.g. placenta percreta). It is a life-saving measure and should not be delayed in situations where haemorrhage is causing uncontrollable physiological instability and control of bleeding does not appear imminent. Prevention of sequelae With the increasing incidence of operative delivery and increasing maternal age, the incidence of MOH is set to increase. The use of Maternal Early Warning System (MEWS) charts to monitor women at risk should allow early detection of bleeding and empower midwives and doctors to escalate patient reviews and treatments. Once coagulopathy has been corrected and there is no indication of ongoing bleeding, thromboprophylaxis with low molecular weight heparin and TED stockings should be started. MOH protocols are vital to disseminate treatment. Drills and simulation to train team management of MOH is recommended. Potential obstacles include logistical difficulties of ensuring available faculty and participants and potential funding difficulties. Declaration of interest None declared. MCQs The associated MCQs (to support CME/CPD activity) can be accessed at www.access.oxfordjournals.org by subscribers to BJA Education. References

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