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## Case Report

## Selective arterial embolisation: a first line measure for obstetric haemorrhage?

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**SUMMARY:** Selective arterial embolisation is increasingly used to arrest intractable postpartum haemorrhage. We report a case of postpartum haemorrhage following a placenta praevia, which had a successful outcome with selective arterial embolisation as the first treatment option. This technique should be more widely available, and in many instances should be considered before and in lieu of any surgical intervention.

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### Introduction

There has been a remarkable decline in the number of deaths from obstetric haemorrhage in the past 50 years. Unfortunately in the Confidential Enquiries into Maternal and Child Health 2000–2002,<sup>1</sup> previously known as the Confidential Enquiries into Maternal Deaths, the mortality rate from haemorrhage was 8.3 per million maternities compared to 3.3 per million maternities in the previous triennium (1997–1999). Seventeen direct deaths due to haemorrhage occurred in the 2000–2002 triennium, ten of these due to postpartum haemorrhage (PPH). Only one death due to PPH occurred in the 1997–1999 report.<sup>2</sup> Data from the United Kingdom Obstetric Surveillance System (UKOSS), a new national system to study rare disorders of pregnancy, indicates that for the 13-month period February 2005–February 2006, there were 315 peri-partum hysterectomies. This gives an estimated incidence of 4.1 cases per 10 000 births (95% CI 3.6–4.5). Nine of the women were known to have had arterial embolisation before hysterectomy.<sup>3,4</sup>

Selective arterial embolisation has been shown to be a safe and effective method of controlling PPH.<sup>5</sup> It is associ-

ated with few major complications and subsequent fertility appears to be well preserved. In the latest Confidential Enquiries no deaths were reported in women who had radiological embolisation. However, no reliable data are available for the number of radiological embolisations performed for obstetric haemorrhage in the UK.

We describe a case of PPH in a pregnant woman at 38 weeks of gestation with associated placenta praevia, which was successfully treated by selective arterial embolisation (SAE) in the interventional radiology suite. We suggest that in some situations SAE should be considered as the primary treatment in patients with PPH.

### Case report

A 35-year-old gravida 2 para 1 at 38 weeks' gestation presented for elective caesarean section. Her past medical/obstetric history included one previous caesarean section for fetal indications, which was performed under general anaesthesia. At her initial antenatal booking visit at 16 weeks' gestation, she weighed 100 kg and had a body mass index of 32 kg/m<sup>2</sup>. It was planned that she should

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have a vaginal delivery provided there were no obstetric complications. However, she was admitted at 34 weeks with a breech presentation, abdominal pain and a small antepartum haemorrhage. Ultrasound scan confirmed a posterior placenta praevia after which she remained in hospital. After consultation with the anaesthetic team the patient agreed to have a caesarean section performed under regional anaesthesia. Antacid prophylaxis was given before surgery and 4 units of blood were cross-matched.

In the operating theatre, two 16-gauge cannulae were inserted. Monitoring included electrocardiogram, non-invasive blood pressure and pulse oximetry. Using an aseptic technique a combined spinal epidural was performed in the left lateral position at L3/4 without difficulty. Hyperbaric 0.5% bupivacaine (1.6 mL) with diamorphine 300 µg was given in the spinal component. Three minutes after insertion the patient had a T4-S2 sensory block to cold. A urinary catheter was inserted and attached to an hourly urine monitor. The patient was then turned supine with a 15° left lateral tilt and surgery was allowed to start.

The caesarean section was uneventful and a 4450-g healthy male baby was delivered with Apgar scores of 8 at 1 min and 10 at 5 min. The umbilical arterial pH was 7.20 and base excess was  $-2.9$  mEq/L. The placenta and its membranes were delivered intact without difficulty. Oxytocin 5 units diluted in 5 mL of normal saline was administered by slow i.v. injection following delivery and an infusion of oxytocin (40 units in 40 mL normal saline) was given at 10 mL/h and continued in the postoperative period for 4 h. Blood loss was estimated at 1000 mL and, as is routine at our hospital for all mothers with placenta praevia, she was transferred to the high dependency unit (HDU) for further monitoring. A postoperative full blood count revealed a haemoglobin of 9.4 g/dL and a haematocrit of 28.8% with a platelet count of  $293 \times 10^9/L$ .

Two hours later while in the HDU she had an acute episode of vaginal bleeding. Her blood pressure dropped to 70/40 mmHg and the heart rate increased to 120 beats/min. Ergometrine 500 µg was given slowly i.v. and was followed by rectal misoprostol 1000 µg. At the same time she was immediately resuscitated with 2 L of Ringers' lactate and transfused with 4 units of packed red cells and 2 units of fresh frozen plasma. The consultant haematologist was informed of the potential for a massive transfusion and 6 more units of blood and 4 more units of fresh frozen plasma were ordered. Haemodynamic stability returned and the patient remained alert and cooperative. A right radial artery line was inserted for closer monitoring and to allow regular blood samples to be taken. Following the transfusion her haemoglobin measured 9.6 g/dL, platelets  $238 \times 10^9/L$ , haematocrit 28.9%, and the international normalised ratio (INR) was 0.94 with a fibrinogen level of 3.04 g/L. At this time the uterine fundus was palpable below the umbilicus. Vaginal examination revealed multiple blood clots in the cervix and vagina with a visible persistent trickle of blood. At this point the options were either to return to theatre for an examination under anaesthesia or to enlist the help of the interventional radiologists.

As the clots appeared to be acting as an effective tamponade, it was agreed that their removal could precipitate

massive haemorrhage. In order to avoid this and as the patient was haemodynamically stable and the placenta and its membranes had been removed at caesarean section intact, the interventional radiology team was contacted and it was decided that the mother should undergo SAE.

She was subsequently transferred to the interventional radiology suite for uterine artery angiography. Following infiltration with 2% lidocaine and using a right femoral artery approach, the right uterine artery was catheterised using a 4 F cobra-shaped catheter (Cobra: Cordis, The Netherlands) and a 0.035-inch-diameter hydrophilic polymer-coated guide wire (Radiofocus; Terumo, Japan). Digital subtraction angiography (Siemens Polystar T.O.P; Siemens AG, Medical Engineering, Germany) revealed an abnormal placental branch with active extravasation; the site of bleeding was then identified (Fig. 1). Embolisation with absorbable gelatin sponge pieces (Gel foam; Spongostan, Johnson & Johnson Medical Limited, UK) was successful. A repeat angiogram showed no further bleeding but some right fibroid branches were seen (Fig. 2). Because



Fig. 1 – Selective angiogram of the right uterine artery demonstrates extravasation of contrast in keeping with haemorrhage (arrows).



Fig. 2 – Post-embolisation angiogram demonstrates no further extravasation of contrast. Incidental prominent fibroid branches (arrows).

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