

## Case Reports

# Uterine Artery Embolization: Exploring New Dimensions in Obstetric Emergencies

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### Abstract

The role of transcatheter arterial embolization in the management of obstetric emergencies is relatively new and not so commonly used. In the following series, the efficacy of this technique in situations such as scar site ectopic pregnancy, antepartum and postpartum obstetric hemorrhage, especially in the presence of coagulation derangement is presented.

**Keywords:** Uterine artery embolization; Scar site ectopic pregnancy; Antepartum hemorrhage; Post partum hemorrhage; Transcatheter arterial embolization.

### Introduction

Uterine artery embolization has recently emerged as a safe, effective, nonsurgical technique for controlling acute and chronic genital bleeding in a variety of obstetric and gynecological conditions. It has long been used for nonsurgical management of uterine fibroids with 82% to 92% success rates.<sup>1</sup> It can also be used in various other obstetric conditions to control life threatening hemorrhage as an alternative to hysterectomy with variable success rates such as abdominal and cervical pregnancy (100%), arteriovenous malformation (96%), post partum hemorrhage (94.9%), and morbidly adherent placenta.<sup>1</sup> Benefits include low complication rates, avoidance of surgical risks, fertility preservation and shorter hospitalization.

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### Case 1

A 28-year-old, G5P2L1A2 female presented with three months amenorrhea and vaginal spotting for the last one week. She had undergone dilatation and curettage twice and also had two lower segment cesarean sections (LSCS) in the past. Her vitals were stable and serum beta human chorionic gonadotropin (HCG) were 5,012 IU/L. Ultrasound showed that presence of a lesion in the region of the isthmus anteriorly in a previous scar area with low impedance and turbulent wave form in periphery. Computerised tomography (CT) angiogram confirmed the presence of a 2.2×1.8 cm cystic area in relation to the anterior aspect of lower uterine segment with arterial channels around it. The lesion caused focal bulge on the posterior wall of the urinary bladder. The myometrium between lesion and the bladder were thinned out. Diagnosis of scar site ectopic pregnancy was considered. The patient was administered methotrexate 50 mg Intramuscular (IM) stat. Serum beta HCG showed a fall, but she continued to have episodes of moderate bleeding per vagina. Uterine artery embolization was done and subsequently her bleeding was controlled. Post-embolization Doppler scan showed a marked reduction in vascularity around the lesion. Her serum beta HCG was undetectable after 5 weeks.

### Case 2

A 33-year-old, G2P1L1 female with previous LSCS was admitted at 28 weeks of pregnancy for anterior placenta previa type IIa and intrauterine death (IUD) with chronic liver disease with coagulopathy. She was stable but had purpuric spots all over her body. Her investigations revealed hemoglobin (Hb): 7.2 gm%, platelet count: 23,000 c/mm<sup>3</sup>, serum bilirubin: 14.3 mg/dL, aspartate aminotransferase (AST): 86 IU/L, alanine aminotransferase (ALT): 64 IU/L, kidney functiona test (KFT): normal, prothrombin time/international normalized ration (PT/INR): 3.63, partial thromboplastin time with kaolin (PTTK): >180 sec, lactate dehydrogenase (LDH): 969, D-dimer: positive, and viral markers: negative. The patient was managed medically with standard anti-coma regime, transfusion of cross matched red blood cells (RBCs), platelets and fresh frozen plasma (FFPs). After two days of admission, she went into spontaneous labor and started heavy bleeding per vagina. Considering her as a high risk for surgery due to coagulation derangement and jaundice, the patient was taken for transarterial embolization. Following embolization, her bleeding was reduced. Her labor progressed well and subsequently

she had vaginal delivery of a 1.1 kg macerated IUD baby with no postpartum hemorrhage (PPH).

### Case 3

A 22-year-old primigravida presented with 40 weeks pregnancy with intrahepatic cholestasis and intrauterine death in early labor. Subsequently, she had a vaginal delivery of a dead baby. Post delivery, the patient had PPH and was resuscitated with intravenous fluids, oxytocic agents, cross matched blood and was explored in Operation Theatre (OT). A tear was detected on the left vaginal wall extending upto the vault. Hemostasis was secured but the patient continued to have tachycardia despite optimum replacement. Subsequently, a mass appeared on the left side of the uterus. Ultrasound revealed a left-sided broad ligament hematoma. She needed urgent laparotomy but by this time her coagulation was deranged. Internal iliac artery embolization was done following which the patient improved.

The procedure for all cases was performed by an intervention radiologist. In this procedure,<sup>2</sup> under local anesthesia, a 5-F vascular sheath was inserted into the right common femoral artery after which arteriogram of bilateral internal iliac arteries was obtained to identify the uterine arteries on both sides as well as any other potential sites of bleeding. A catheter was introduced over a 0.035-inch guide wire to access the internal iliac arteries and its branches. A microcatheter was used for super selection of the transverse or ascending segments of the uterine arteries. Absorbable gelatin sponge was the embolic material of choice.

### Discussion

There are certain obstetric emergencies where, despite requirement of surgical intervention, obstetricians face a dilemma either due to patient's poor general condition or her desire for preservation of fertility. In such situations, this technology can be a boon.<sup>3</sup> Management of pelvic hemorrhage remains a critical concern to obstetricians and gynecologists. After failure of conservative local measures, such patients are treated with bilateral hypogastric or uterine artery ligation. Refractory hemorrhage needs to be treated with surgical hysterectomy as a life saving measure with resultant loss of fertility.<sup>2</sup>

Scar site ectopic pregnancy is a rare condition which occurs in women with previous uterine scar when implantation takes place at the site of scar.<sup>3,4</sup> Diagnosis is difficult but is made on sonography and can be confirmed by three dimensional Doppler and Magnetic Resonance Imaging (MRI).<sup>5</sup> There are no set criteria for deciding the mode of therapy and each case should be treated individually. Expectant management can be done for silent miscarriage in the sac but it carries significant risk of hemorrhage. Surgical treatment by evacuation of the sac and excision and repair of the gaped scar through laparotomy or laparoscopy can be done. One may also opt for medical treatments using local (potassium chloride, methotrexate) or systemic (methotrexate) agents.<sup>5</sup> Uterine artery embolization

(UAE) has been used in combination with either medical or surgical approaches.<sup>4,6</sup> In the presented cases, a combination of systemic methotrexate along with selective embolization was effective.

The most common causes of obstetric hemorrhage where transcatheter embolization has been found to be effective are vaginal/cervical laceration, morbidly adherent placenta and placenta previa.<sup>7</sup> In the above case of antepartum hemorrhage with minor degree of placenta previa and a dead fetus, because of severe hemorrhage, surgery (LSCS) was inevitable. However, due to markedly deranged coagulation profile and high risk of anesthesia, surgery would have been a catastrophe. Thus embolization was found to be the right choice to save the patient's life. Although embolization cannot be done before delivery with a live fetus, in this case, it was possible before delivery because of intra uterine demise.

Angiographic selective arterial embolization has been found to be a safe and effective method of controlling severe PPH in 90% to 95% of cases irrespective of the cause of PPH.<sup>8,9</sup> In a hemodynamically stable patient not responding to medical treatment and uterine tamponade, early consideration and implementation of arterial embolization has its own advantages, as compared to internal iliac artery ligation or hysterectomy. The advantages of UAE are easy identification of bleeding site, decreased re-bleeding from collaterals as more distal occlusion of bleeding vessels are carried out, preservation of uterus and fertility, and avoidance of laparotomy and technically difficult hysterectomy.<sup>10</sup> When facilities for uterine artery ligation and UAE are available in a hemodynamically stable patient, the first choice would be embolization as the procedure has higher success rates (>90%) compared with hypogastric artery ligation (40% to 75%),<sup>10,11</sup> and finally, if embolization fails, hysterectomy can still be performed.<sup>10</sup> It has been seen that even if embolization fails to treat the hemorrhage completely, it might decrease intraoperative blood loss during subsequent hysterectomy if needed.<sup>8</sup>

Ever since its first description in 1979, many case series have reported high technical success rates of UAE in PPH with good clinical outcomes.<sup>10</sup> Lee et al.<sup>2</sup> reported overall clinical success rate of UAE as high as 90.4% with both initial and repeat sessions. The authors reported no major complications in their series. Ganguli et al.<sup>12</sup> reported technical success rate of procedure for PPH as 100%, clinical success rate of 95% and complication rate of 4.5%. Authors also reported dramatic reduction in blood product requirements after UAE (3.1 U PRBCs before and 0.4 U after). Kirby et al.<sup>13</sup> reported clinical success rates as 79%. In their study, clinical success was not found to be related to mode of delivery or cause of PPH. Touboul et al.<sup>14</sup> reported the efficacy as 71.5%. Uterine atony was associated with positive outcome with an overall success rate of 88.6% (OR 4.13, 1.35-12.60). However, cesarean deliveries (OR 0.16, 0.04-0.5) and hemodynamic shock (OR 0.21, 0.07-0.60) were associated with higher failure rates, 47.6% and 39.1%, respectively. Transcatheter arterial embolization is a relatively safe procedure; however, adverse effects resulting from uterine artery embolization have been reported, but serious adverse effects are approximately

four times less frequent than for a hysterectomy. The potential complications of angiography include low grade fever, hematoma at the site of catheter placement, infection like pelvic abscess, contrast-related side effects, ischemic phenomena, and rarely iliac artery perforation.<sup>10</sup> The most commonly reported long-term side effects are transient buttock numbness and urinary frequency. Pelvic arterial embolization affects ovarian reserve adversely as it interferes with ovarian blood supply. It may also produce adverse effects on sexual function due to interference with blood supply to the clitoris, cervix, and uterus. However, on follow-up of these cases, improvement in pelvic organ blood supply and consequent improvement in function has been seen.<sup>15</sup>

## Conclusion

The role of transcatheter arterial embolization in management of obstetric emergencies is relatively new and uncommonly used. Its use in treatment of female genital tract bleeding needs more collaborative studies by gynecologists and interventional radiologists to evaluate issues related to long term effects on menstruation and fertility.<sup>11,16</sup> Its initial use seems encouraging even in obstetric emergencies, but due to a small number of cases, it needs further exploration.

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