Uterine Artery Embolization for Postpartum Hemorrhage

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ABSTRACT: **Postpartum hemorrhage is the leading cause of maternal death. Uterine artery embolization can play an important role in early intervention for a good outcome and may reduce the need for a hysterectomy. This article addresses how early collaboration between obstetricians and interventional radiologist is vital in improving patient outcomes. (J Radiol Nurs 2016;35:142-145.)**

KEYWORDS: **Uterine artery embolization; Postpartum hemorrhage; Interventional radiology.**

INTRODUCTION

Postpartum hemorrhage (PPH) remains one of the leading issues in women's health today and is the leading cause of maternal death (Horng et al., 2011). There have been considerable advances reducing maternal mortality in the last several decades; however, the issue of PPH continues to be a problem in the United States. Therefore, PPH is a key problem to address to decrease maternal morbidity and maternal mortality (Howard & Grobman, 2015).

PPH is classified based on the amount of blood loss and the time it develops after delivery. Blood loss exceeding 500 mL within the first 24 hr after delivery is considered to be PPH and occurs in about 18% of deliveries. *Severe* PPH is defined as blood loss exceeding 1,000 mL and occurs in 1% to 5% of deliveries (Ganguli, Stecker, Pyne, Baum, & Fan, 2011). Secondary PPH is blood loss that occurs beyond 24 hr after delivery (Ganguli et al., 2011).

First-line nonsurgical management for PPH includes the use of fundal massages and uterotonic medications, such as oxytocin, ergot alkaloids, and prostaglandins. Surgical management includes repair of lower genital tract lacerations, uterine hypogastric artery ligation, uterine balloon tamponade, and finally a hysterectomy (Kim et al., 2013).

Since the late 1960s, transcatheter arterial embolization procedures have been used to control pelvic hemorrhage secondary to trauma, malignancy, or radiation-induced bleeding (Horng et al., 2011). The first reported case of uterine artery embolization (UAE) used to control PPH was in 1979. Since then, multiple institutions and studies have reported the effectiveness and usefulness of this technique as first-line treatment to treat PPH (Horng et al., 2011). It was found to be a safe and effective procedure offering patients potential fertility-preserving options (Horng et al., 2011).

Case Study

A 38-year-old woman with history of intrauterine fetal demise approximately 2 weeks prior presented to the hospital for admission for a dilation and evacuation. Her surgery was complicated by vaginal hemorrhage secondary to disseminated intravascular coagulation (DIC), which resulted in pulseless electric activity arrest. She was successfully resuscitated, intubated, and transferred to the intensive care unit. After her transfer, she had significant bleeding from her uterus, and a hemorrhagic protocol was initiated, and an uterine balloon tamponade device was placed to help control her bleeding. Despite the uterine tamponade, the patient continued to bleed, and at this point, interventional radiology was consulted for an emergent UAE.

On the patient's pelvic angiogram, no acute hemorrhage was seen, but it was noted that both her uterine arteries were hypertrophied, which is a secondary

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finding in the setting of hemorrhage (Figure 1). The patient's uterine arteries were embolized to near complete stasis using four packs of Gelfoam (Figure 2). The right groin 6-French sheath was left in place with plans for removal when the international normalized ratio (INR) was normalized, given the risk of developing a hematoma and pseudoaneurysm. The patient became hemodynamically stable the next day. She was then extubated, and the sheath was removed. She was discharged from the hospital on her third postoperative day.

Uterine Artery Embolization

Patient Assessment. Discussion with the obstetrics service regarding details of the delivery is a good starting point to evaluate the patient. It is important to assess if there were any significant comorbidities, likelihood of any iatrogenic injury and if there were any failed attempts at uterine ligation. Physical examination of the patient includes review of recent laboratory results, imaging studies, and a peripheral vascular examination. Optimal laboratory values include serum creatinine $<$ 1.5 mg/dL with an estimated glomerular filtration rate $>$60, a platelet count of $>$50,000/dL, and an INR $<$ 1.5 (Gipson & Smith, 2013).

Technique. An UAE is first performed by accessing the right common femoral artery. Selection of the contralateral uterine artery is routinely performed first (Ganguli et al., 2011). After angiography is done to confirm catheter position in the distal uterine artery, embolization is performed using absorbable gelatin sponge (Gelfoam Pharmacia and Upjohn, New York, NY) or microspheres (Embospheres®; BioSphere Medical, Rockland, MA) mixed in a saline solution and contrast medium. Complete embolization is reached once stasis of flow in the uterine artery has been accomplished. Using the same femoral access and the same process, the ipsilateral uterine artery is embolized.

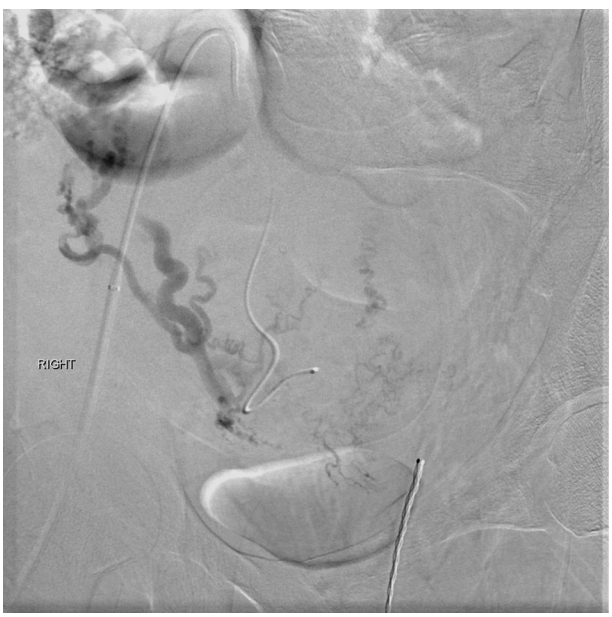

Figure 1. On the pelvic angiogram, no acute hemorrhage was seen, but it was noted that both her uterine arteries were hypertrophied, which is a secondary finding in the setting of hemorrhage.

Figure 2. Patient's uterine arteries were embolized to near complete stasis using Gelfoam.

Complications

UAE is a minimally invasive procedure that is widely used to control bleeding. There are minor complications that have been reported, such as lower abdominal pain, transient fever, nausea, and vomiting. These are mostly considered to be adverse reactions and part of the constellation of common symptoms of postembolization syndrome (PES). Although at a lower rate, major complications have been reported to include transient buttock ischemia, transient foot ischemia, iliac artery perforation, and abscess, and have a complication rate of approximately 9% (Gipson & Smith, 2013).

According to Gipson and Smith (2013), a possible cause of UAE failure is "vascular spasm in the setting of shock or impeding shock due to massive blood loss." Vascular spasm, shock, and DIC can frequently occur in the long interval between the onset of bleeding and embolization.