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Uterine artery embolization to treat hemorrhage following second-trimester abortion by dilatation and surgical evacuation

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Abstract

Background: This study was conducted to review cases of second-trimester postabortal hemorrhage (PAH) occurring at a private women's health facility that were treated with uterine artery embolization (UAE).

Methods: A retrospective review was conducted on all second-trimester terminations performed at a private women's health facility between 1999 and 2006. Cases of PAH treated with UAE were reviewed in detail, reviewing progress, operative and discharge notes along with anesthesia records.

Results: Fifteen cases of PAH were identified among 3936 second-trimester terminations that were performed. Seven cases were identified in which UAE was used to treat PAH. Etiologies leading to hemorrhage varied in the seven cases as did the presence of coexisting factors such as infection and anatomic lesions. All cases were successfully treated by UAE, requiring no additional surgical intervention.

Conclusion: Given the success of embolization, we offer this as an alternative to exploratory surgery and hysterectomy and as a first-line approach in cases of PAH after conservative management strategies have failed.

Keywords: Postabortal hemorrhage; Uterine artery embolization; Cervical laceration; Second-trimester termination

1. Introduction

Hemorrhage after spontaneous or induced abortion is an uncommon event with estimated rates of 0.1 to 21 per thousand cases [1]. This complication appears to be more frequent at later gestational ages (GAs) [2]. Postabortal hemorrhage (PAH) can result from cervical or vaginal lacerations, uterine perforation, retained tissue, uterine atony, infection, uterine arteriovenous malformation, abnormal placental implantations (including placenta previa, accreta, increta and percreta) and coagulopathy. Coagulopathy may be a primary cause of PAH, for example, disseminated intravascular coagulation (DIC) following fetal demise, where DIC occurs secondary to tissue thromboplastin release. Coagulopathy-associated PAH may also be secondary, as is the case with amniotic fluid embolism or secondary to acute, rapid blood loss. Management of these complications, if local measures and medications are ineffective, has traditionally required surgical interventions with bilateral hypogastric artery ligation, uterine artery ligation, B Lynch sutures or hysterectomy. Failure rates for these methods have been due to the extensive collateral circulation in the pelvis, necessitating a high incidence of hysterectomy.

Since the 1960s, uterine artery embolization (UAE), also known as percutaneous transcatheter embolization, has been used to control pelvic hemorrhage resulting from malignancy, trauma, radiation and postpartum hemorrhage [3,4]. The use of embolization has the advantage of avoiding surgery and preserving the uterus. Success rates for control of bleeding for postpartum hemorrhage have been reported to be greater that 90% [3,4]. There are few reports to support the use of embolization for the control of PAH. Furthermore, conservative intervention has been particularly ineffective in cases of PAH occurring from intracervical trauma, thus requiring a high incidence of hysterectomy. We report the results of seven patients with PAH following second-trimester termination, successfully treated with embolization.

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2. Materials and methods

Approval was obtained through the Partners Human Research Committee of Brigham and Women's Hospital IRB. All second-trimester terminations performed in a private women's health facility between January 1999 and December 2006 were reviewed. Cases were identified if they experienced hemorrhage (greater than 500 cc estimated blood loss) following second-trimester termination, uncontrolled by local management or uterotonic medications and requiring emergent transfusion and subsequent hospital management. All cases of PAH were referred to the same tertiary care center approximately 10 min by ambulance from the facility. All cases of PAH treated with UAE were reviewed in detail. For each woman, the records reviewed included the admission note, discharge summary, radiology, operative report, hospital records, laboratory results and abortion facility records. The standard second-trimester dilation and evacuation protocol for this facility includes intraoperative ultrasound guidance, preoperative intracervical vasopressin injection (for cases >19 weeks), preoperative cervical ripening with laminaria (for 1 day prior to 14 to <19 weeks' GA and for 2 days prior to 19 to 23 weeks' GA). Procedures are performed by an obstetrics and gynecology resident or family planning fellow (with direct attending supervision) or by an attending physician. All procedures are performed under intravenous sedation with propofol and fentanyl given by a nurse anesthetist or anesthesiologist. At the tertiary care center, embolization is performed by interventional radiologists, under intravenous conscious sedation, using femoral artery catheterization and arteriogram for visualization of the appropriate vessels. Once visualized, gel-foam pledgets were injected for vascular obstruction. Following injection, blockage is confirmed via repeat arteriogram.

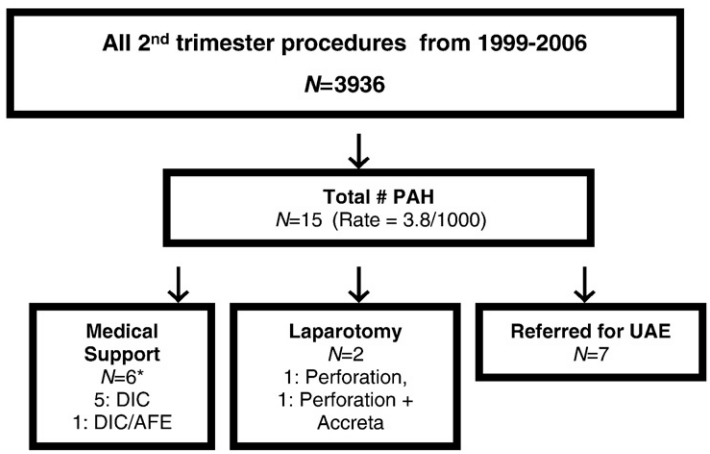
3. Results

There were 3936 second-trimester terminations performed during the period of 1999 to 2006. Of these, 15 cases of PAH were identified (Fig. 1). Six cases of PAH caused by DIC were identified (one secondary to amniotic fluid embolism and five due to fetal demise). The duration of fetal demise prior to termination is unknown. All were successfully managed with medical support including intravenous fluids, oxygen, monitoring and blood products. Two cases of PAH occurred due to uterine perforation and were treated surgically. Of these, one patient required a hysterectomy and subsequent pathology revealed a placenta accreta. The other patient underwent exploratory laparotomy with uterine repair.

Seven patients between 19 and 23 weeks' gestation who underwent second-trimester termination and experienced PAH that was not believed to be due to DIC, retained products or uterine perforation were identified. All were transferred to the same tertiary care center for emergent UAE with gel-foam pledgets. Patient history and presumed etiology for PAH are listed in Table 1. Patients were between 17 and 39 years of age and were both nulliparous and multiparous, with GAs from 19 to 23 weeks. Notably, in five of the seven cases, intracervical laceration was thought to be the source for the hemorrhage. Three of the seven patients had risk factors in their history, which increased the likelihood of a PAH, including a history of postpartum hemorrhage and intrauterine synechiae in Patient 2, a history of cesarean section and prior myomectomy in Patient 6 and the presence of uterine fibroids in Patient 1.

The medical course for these patients is summarized in Table 2.

No patient required any additional surgical intervention postembolization to control bleeding. All patients had an



PAH: Post-abortal Hemorrhage; DIC: Disseminated intravascular coagulation; AFE: Amniotic Fluid Embolism; UAE: Uterine Artery Embolization
* All 6 cases of DIC occurred following fetal demise

Fig. 1. Second-trimester procedures and distribution of complications from 1999 to 2006.