

# Late postpartum hemorrhage due to uterine arteriovenous malformations

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## Abstract

Uterine arteriovenous malformations (AVM) are rare but potentially life-threatening conditions that should be suspected in late postpartum hemorrhage. We report two cases of uterine AVM representing the two different endpoints. The first case was diagnosed only by pathological examination after hysterectomy that was resistant to conservative management and the other case was diagnosed by the multiple imaging modalities managed by unilateral angiographic embolization of the uterine artery.  
**Keywords:** arteriovenous, hysterectomy, artery, malformation

## Introduction

Uterine arteriovenous malformations (AVM) are rare but potentially life-threatening conditions that should be suspected in late postpartum hemorrhage. The true incidence of AVM is unknown<sup>(1)</sup>. The most common presentation is a sudden onset of heavy vaginal bleeding. The bleeding can vary from menorrhagia or metrorrhagia to chronic low grade bleeding. Uterine AVMs are also known as secondary or late postpartum hemorrhage<sup>(2)</sup>. AVM generally develop after uterine trauma such as curettage<sup>(3)</sup> or cesarean section<sup>(4)</sup>. It is postulated that an acquired AVM may arise when endometrial venous sinuses become incorporated into the myometrial scars after

necrosis of the chorionic villi<sup>(5)</sup>. We report two cases of uterine AVM representing the two different endpoints of the condition. The first case was diagnosed by pathological examination after hysterectomy; resistant to conservative treatment and the other case was diagnosed by the multiple imaging modalities managed by unilateral angiographic embolization of the uterine artery embolization (UAE).

## Two Case Reports

**Case 1:** A 26 year-old woman; gravida 1, parity 1, presented to the emergency department with heavy postpartum vaginal bleeding and passage of blood clots. Her hemoglobin was 5.3 gram in the

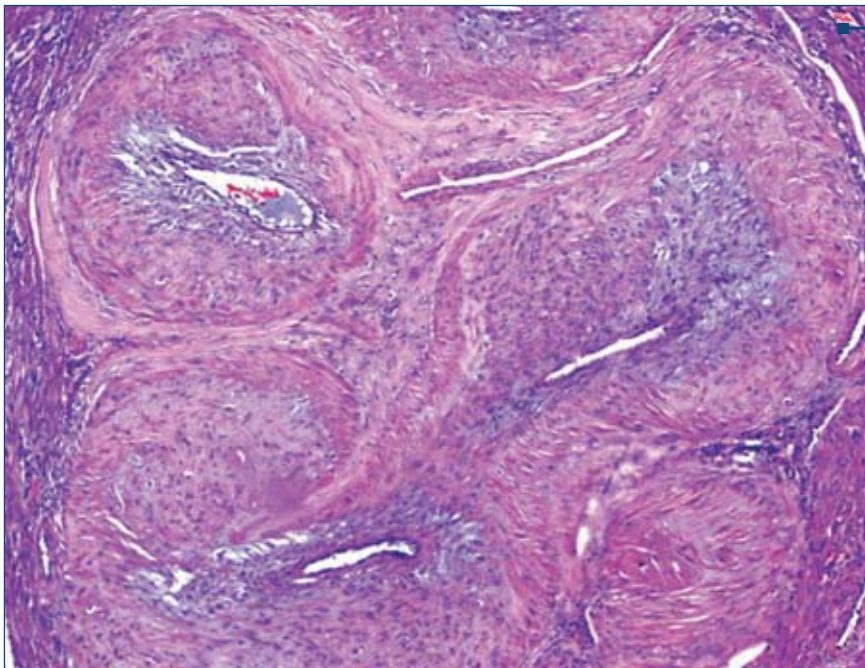


Figure 1. Intramyometrial vessels with anastomosis (HE, x100)

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emergency room. She had her cesarean delivery 21 days ago. There was no abnormal transabdominal ultrasonographic finding.

**Case 2:** A 27-year-old gravida 4, parity 2, presented to the outpatient gynecology clinic with complaints of previous heavy vaginal bleeding and passage of blood clots two days before. She had cesarean delivery 42 days ago. She showed regular periods previously without any menorrhagia history. On admission, she was hemodynamic stable. Bimanual examination revealed a normal sized uterus.

## Results

In the first case, the coagulometry tests were normal. Following steps of conservative management for the treatment of uterine atony were applied: manual massage, administration of dilute oxytocin 40 IU added to 1 L of intravenous fluid; methylergonovine, 0,2 mg given intramuscular injection; and misoprostol 400 mcg rectal suppository.

Failure of the conservative treatment modalities lead to prompt decision of laparotomy.

Ligation of the bilateral uterine arteries, B-lynch suture, intramyometrial methylergonovine, bilateral ligation of hypo gastric arteries was applied. Hysterectomy was unfortunately performed because of the uncontrolled bleeding, decrease in blood pressure, oliguria and increase in pulse rate. About 5 units of erythrocyte and 5 units of fresh frozen plasma were administered during the operation. Pathological diagnosis of the hysterectomy revealed a uterine AVM (Figure 1).

In the second case, the hemoglobin value was 13 g. The platelet count and coagulation profile were normal.



Figure 2. Endovaginal sagittal colour Doppler ultrasound of the uterus displaying marked hypervascularity throughout the mass

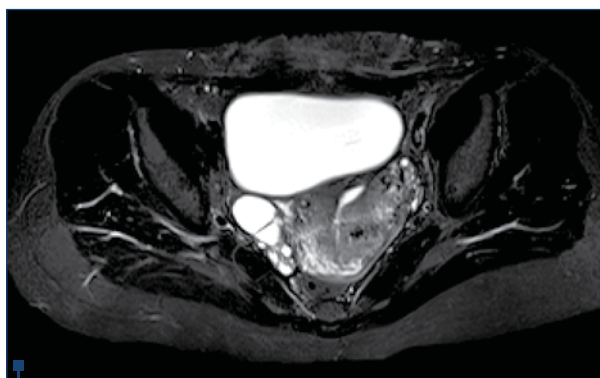


Figure 3. Intravenous pelvic magnetic resonance imaging angiography revealing early venous filling and pooling of venous drainage confirming the AVM

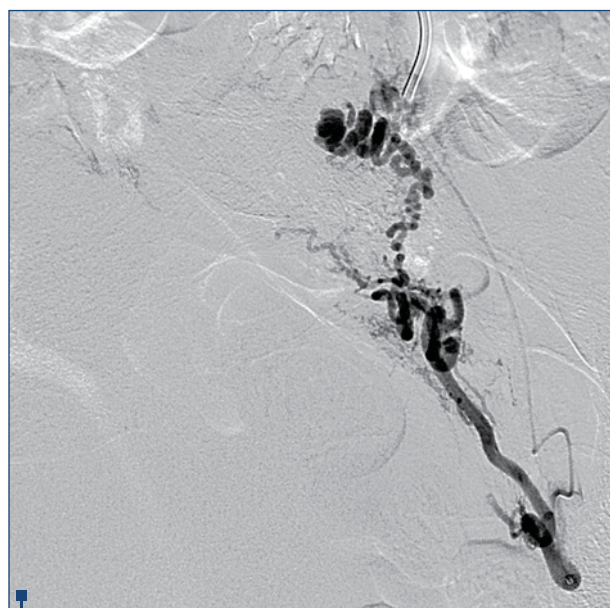


Figure 4. Digital subtraction angiogram demonstrating a uterine arteriovenous malformation supplied by the left uterine artery

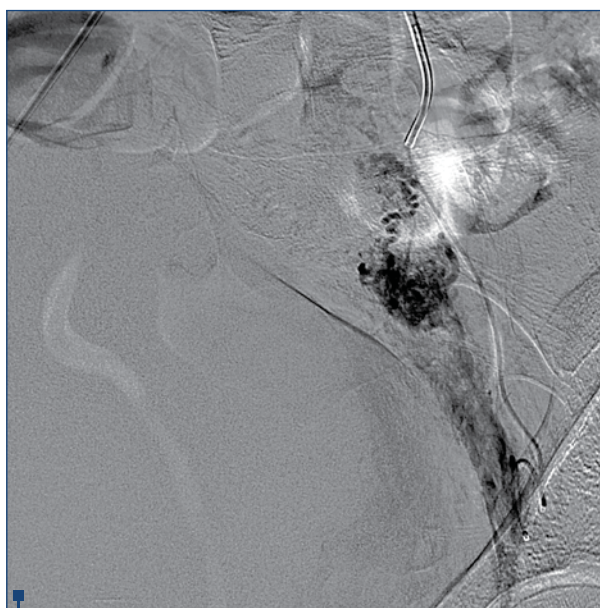


Figure 5. Post-embolization digital subtraction angiogram showing marked devascularisation of the uterine arteriovenous malformation

Transvaginal ultrasonographic scan showed slightly enlarged uterus (8.6 x 5.4 x 7.2 cm), 9 mm endometrial lining and a vascular mass in the uterus measuring 10 mm in diameter with low resistance of flow within, concerning for arteriovenous malformation or an arteriovenous fistula (Figure 2).

Intravenous pelvic magnetic resonance imaging angiography revealed early venous filling and pooling of venous drainage confirming the AVM (Figure 3). She underwent angiography and left UAE at the interventional radiology unit (Figures 4 and 5). She had normal transvaginal ultrasonography at the 15<sup>th</sup> postoperative day.

## Discussion

Although there are fewer than 100 cases of uterine AVM reported in the medical literature, prompt diagnosis and treatment are very important because of the life-threatening profuse uterine bleeding<sup>(6)</sup>.

Our study shows two variable cases and end points of the AVM, drawing the attention on the different imaging modalities that can be used for the diagnosis.

Uterine AVMs should be differentiated from retained products of conception. The management of patients with uterine AVMs or retained products of conception is very different. Uterine curettage is the initial procedure used for the retained products of conception, but it is contraindicated in patients with uterine AVMs. Therefore, a prompt, accurate diagnosis is important<sup>(6)</sup>.

Determination of the family, personal medical history and medication use are the essential steps in the diagnosis. After endometrial causes have been excluded, it is also reasonable to consider systemic causes of depletion or dysfunction of platelets and/or clotting factors or other chronic medical disorders.

Late postpartum hemorrhage following caesarean section is not uncommon, but it is unlikely to be associated with retained placental tissue so the physician should also have the curiosity about the AVM in all patients with late postpartum heavy bleeding<sup>(7)</sup> uterine wound angle necrosis (WAN) following caesarean section can also be considered in differential diagnosis.

A lower uterine incision, made close to the relatively avascular cervix and erosion of the uterine

artery secondary to infection may predispose to WAN. The diagnosis of WAN can only be made possible at exploratory laparotomy.

Noninvasive evaluations are preferred to rule out uterine AVM. There are many imaging modalities used for the diagnosis of uterine AVMs.

In the second case report, we have first found a hypo-echoic area in the myometrium at ultrasonography. Our previous AVM experience that has resulted by hysterectomy had led us to meticulous examination of the myometrium. We have also performed color doppler ultrasonography which have high sensitivity for the diagnosis<sup>(8)</sup>.

Finally intravenous pelvic magnetic resonance imaging angiography revealed pooling of venous drainage confirming the AVM. Angiographic computer tomography with intravenous administration is a more rapid technique in contrast to magnetic resonance angiography which can be successfully used in unstable patients<sup>(1,9)</sup>.

The management of uterine AVMs should consider the age of the patient and future fertility. Angiography and UAE are indicated in stable patients who plan future pregnancies<sup>(10)</sup>.

Hysterectomy should be considered in patients with recurrent bleeding after UAE or in patients who are not planning future pregnancies. In our first case the patient was hemodynamic unstable.

Only a prompt ultrasonographic examination could be performed in the emergency room.

The nonsurgical and surgical methods for the control of hemorrhage have been failed and there was no time for the consideration for UAE.

## Conclusions

Our study shows that uterine AVMs should be suspected in women who present with abrupt, profuse late postpartum uterine bleeding.

Color Doppler ultrasonography, angiographic computer tomography and magnetic resonance angiography are the diagnostic procedures that can be applied in hemodynamically stable patients.

Having in the view that in the past, hysterectomy was the only diagnostic and therapeutic approach, currently, a more conservative approach to treatment with UAE is preferred, especially in women of reproductive age. ■

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