Pseudoaneurysm Of The Uterine Artery Presenting As A Cystic Sol In Fundus: Diagnosis And Non Surgical Management

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Abstract

To our knowledge, pseudoaneurysm of uterine artery presenting as a large cystic SOL in the fundal myometrium in post abortal setting is not reported and should be included in the differential diagnosis of large cystic uterine lesions in appropriate clinical setting.

Ultrasonography (US) is the most commonly performed initial imaging examination for evaluation of abnormal uterine bleeding. Color and duplex Doppler US allows convincing detection and diagnosis of pseudoaneurysms and helps differentiate vascular abnormalities that require embolization from nonvascular abnormalities.

Multiple therapeutic options have evolved in recent years with a shift from the traditional surgical option toward a less invasive approach for the treatment of uterine pseudoaneurysms and include radiologic procedures such as endovascular management (embolization), bimanual compression and US-guided percutaneous thrombin injection. The use of noninvasive treatment has led to a marked decrease in the morbidity and mortality rates for pseudoaneurysms.

INTRODUCTION

Pseudoaneurysms result from arterial wall laceration or puncture, allowing blood to dissect into the periartrial tissues and to create a perfused sac that communicates with the parent artery lumen.1 Colour Doppler US is the primary imaging modality with definitive diagnostic features1.

The mainstay for successful treatment for the pseudoaneurysms is transcatheter arterial embolization, although many other therapeutic options have been described in sporadic isolated case reports.

We report the diagnosis and management of uterine artery pseudoaneurysm presenting as a large cystic SOL in the fundus in post abortal setting.

CASE REPORT

A 27 year old woman came to our department with intermittent vaginal bleeding after D&C for therapeutic abortion 60 days earlier. Serum BHCG was negative. Transvaginal pelvic sonography showed an empty endometrial cavity, EE- 4mm Fig 1. Additionally, there was a rounded thick walled structure filled with internal low level mobile echoes at the endometrial-myometrial interface in fundus measuring 4.1 x4.2 cm Figure 1.

A transverse color Doppler image Fig 2 showed that the cystic structure is filled with blood and has varying colors.
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with turbulent arterial flow within the sac Fig.3 and a swirling blood flow pattern at the base of this structure (not shown). Based on the constellation of above findings, pseudo aneurysm was diagnosed. A communicating neck to an adjacent artery could not be identified. Myometrium beyond the fundus was present all around. No dilated veins were detected around the lesion on Doppler sonography.

**Figure 2**
A communicating neck to an adjacent artery could not be identified. Myometrium beyond the fundus was present all around. No dilated veins were detected around the lesion on Doppler sonography.

The patient was admitted for planned transcatheter uterine artery embolization on the basis of the sono-graphic findings. Angiography was performed using the Seldinger technique through the common femoral artery. Initial pelvic angiography was performed, followed by selective internal iliac angiography and uterine angiography. Right Fig.4 and left Fig. 5 uterine arteriograms showed a pseudoaneurysm supplied by bilateral uterine arteries approximately 4-cm in the region of the fundus, corresponding to the sonographic images. Subsequently, the embolisation was performed using Gelfoam which was carefully introduced into the uterine artery until stasis of flow was confirmed angiographically. Embolization of the contralateral uterine artery was performed in the same manner. Complete stasis of flow was achieved following embolisation. A postembolization right Fig.6 and left Fig.7 uterine arteriograms showed occlusion of flow to the region of the pseudoaneurysm. There were no procedural complications. Selective right Fig 4 and left Fig 5 uterine arteriograms show a pseudoaneurysm supplied by bilateral uterine arteries.

There was also a small amount of fluid within the pelvis. The ovaries appeared normal.

**Figure 3**
A transverse color Doppler image shows that the cystic structure is filled with blood and has varying colors with turbulent arterial flow within the sac.

A transverse color Doppler image shows that the cystic structure is filled with blood and has varying colors (arrows) with turbulent arterial flow within the sac and shows a swirling blood flow pattern at the base of this structure (figure not shown).
**Figure 4**
Selective right uterine arteriograms show a pseudoaneurysm supplied by bilateral uterine arteries.

**Figure 5**
Selective left uterine arteriograms show a pseudoaneurysm supplied by bilateral uterine arteries.

A postembolization right Fig 6 and left Fig 7 uterine arteriograms shows occlusion of flow to the region of the pseudoaneurysm.
**DISCUSSION**

Pseudoaneurysm of the uterus has been recognized very long ago and the first description of the similar lesion was given by a Polish surgeon Franz Konig in 1955. Uterine pseudoaneurysms have been reported to occur with a history of a wide range of uterine trauma in both obstetric and gynecology practice (3-12). Non-traumatic etiologies have also been reported although rare after uncomplicated spontaneous vaginal deliveries in association with pregnancy, abnormal placentation, gestational trophoblastic neoplasia, and leiomyoma without prior surgery or pregnancy. Other uterine vascular injuries include AVM, pseudoaneurysm with AVM, AVF, Direct arterial branch rupture.

A patient who presents with extensive vaginal bleeding with a normal B-HCG level in postabortal setting, especially after any instrumentation, should be suspected to have an iatrogenic vascular injury. The diagnosis can be made on transvaginal color Doppler US, which should be performed prior to any further instrumentation as further curettage can make the bleeding worse. Pseudoaneurysms result from inadequate sealing of a laceration or puncture of the arterial wall during surgery or penetrating trauma. Under the influence of sustained arterial pressure, blood dissects into the tissues around the damaged artery and forms a perfused sac that communicates with the arterial lumen.

D&C may cause a pseudoaneurysm, an AVM, or both. The vessels of an AVM are apt to be injured even by minute trauma, with a resulting concomitant pseudoaneurysm. The location of the pseudoaneurysm is dependent on the clinical setting and mode of trauma. The most common location reported in the literature is the isthmic region at the junction of uterine body and cervix in the setting of cesarean section. Postabortal pseudoaneurysms after dilatation and curettage can occur anywhere in the uterine body and fundus. To our knowledge, fundal location of the pseudoaneurysm as a large cystic lesion in postabortal setting has not been reported.

Gray-scale US shows a pulsating anechoic or hypoechogenic structure anywhere in the uterine body and fundus. Doppler US helps establish the diagnosis. Blood-filled cystic structure with varying colors in and around the uterus characterized by a typical swirling motion called the “yin-
yang sign” is diagnostic 1. Within the pseudoaneurysm sac, swirling arterial flow with different directions and velocities is seen, with varying colors according to the variable degree of turbulence at color Doppler US as demonstrated in our case. In the neck of the pseudoaneurysm, the to-and-fro pattern may be potentially identified at duplex Doppler US because the arterial blood flows like a jet (forward flow) into the aneurysm cavity during systole, then reverses (backward flow) into the original artery during diastole 19. This pattern is explained by the pressure gradient between a distended, high-pressure pseudoaneurysm and a low-pressure artery during diastole 20. However, in the case of a uterine artery pseudoaneurysm, demonstration of the neck of the pseudoaneurysm at US may be difficult because of the small size of the parent artery 19. Within the uterine myometrium, as may have been the case with our patient where the location was in the fundus. Radiologic techniques with greater sensitivity has an important role not only in the diagnosis but also management. A complete work-up will help in determining the cause, location, morphologic features, rupture risk, and clinical setting of the pseudoaneurysm; identifying any patient comorbidities; and evaluating surrounding structures and relevant vascular anatomy, information that is essential for treatment planning.

Differential diagnoses of large cystic uterine lesions reported in literature include cystic degeneration of uterine leiomyoma, cystic adenomyosis (adenomyotic cysts), congenital uterine cysts such as mesonephric and paramesonephric cysts, cervical nabothian cysts, intramyometrial hydrosalpinx, and echinococcal cysts 21. The characteristic Doppler findings permits confident diagnosis and differentiation between various cystic lesions of uterine myometrium. Transcatheter arterial embolization has emerged as a highly effective technique for controlling obstetric and gynecologic hemorrhage 1. Absorbable gelatin sponge pledgets are usually the material of choice for embolization of acquired AVMs, pseudoaneurysms arising from small branches, cases of combined AVM and pseudoaneurysm, and direct arterial rupture because of the ease of delivery and the duration of effect. The 3–5-week duration of occlusion by absorbable gelatin sponge pledgets is sufficient to stop hemorrhage while still permitting slow development of collateral vessels 1.

After embolization of both uterine arteries, preservation of fertility and the resumption of menstruation are possible because of the temporary occlusion by absorbable gelatin sponge pledgets and the extensive collateral circulation from pelvic arteries 14. In our case, after embolization of both uterine arteries, the bleeding stopped indicating the success of embolisation with resumption of normal menstrual cycles.

Steinauer et al 22 in his study summarized the efficacy of post abortion uterine artery embolization in cases of refractory hemorrhage. Embolization was successful in 90% of cases. All failures were in patients who had confirmed abnormal placentaion. When retained villi are abundantly present within a pseudoaneurysm, rapid recruitment of collateral vessels following arterial embolization may occur from pelvic arteries, recanalizing the pseudoaneurysm 23. This can occur in the setting of abnormal placentation (placenta accreta) and gestation trophoblastic neoplasia. Embolisation with chemotherapy is recommended in such setting.

Another important cause of embolization failure is inadequate embolization of a pseudoaneurysm supplied by extrauterine feeding arteries, such as the internal pudendal artery, ovarian artery, inferior epigastric artery, or contralateral uterine artery 23. Thus, the serum hCG test and a meticulous search for possible feeding arteries during angiography are recommended to avoid embolisation failure. In our case the serum beta HCG was negative and there were no extrauterine feeders at angiography.

The reported mean radiation dose to the ovaries is 586 mGy (range 204-729 mGy) 24. Patients who are hemodynamically stable can undergo conservative management with observation as there are reports of spontaneous complete resolution of aneurysm 19. Other less invasive Therapeutic options include radiologic procedures such as US-guided bimanual compression 25, US-guided percutaneous thrombin injection 26. The use of noninvasive treatment has led to a marked decrease in the morbidity and mortality rates for pseudoaneurysms.

CONCLUSION

Pseudoaneurysm of uterus in the post abortal setting can present as a cystic lesion in the myometrium with a characteristic diagnostic features on ultrasound and colour doppler. Placing the imaging findings in the clinical context (ie, the history of the cause of the pseudoaneurysm) allows the diagnosis of a pseudoaneurysm. Uterine artery embolization is an alternative to hysterectomy in patients with postabortion hemorrhage refractory to conservative
measures, with no major short- or long-term side effects.

References
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