Intrauterine arterial pseudoaneurysm, a rare cause of per vaginal bleeding

Ashraf Talaat Youssef¹

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Abstract

The current study evaluated two cases of pervaginal bleeding subsequent of intrauterine arterial pseudoaneurysm. Each case was complaining of intermittent attacks of heavy vaginal bleeding: one case with history of cesarean section and the other case after uterine curettage. Intrauterine arterial pseudoaneurysm can be caused by a traumatic injury to the vessel wall with subsequent formation of periarterial hematoma that liquefies forming periarterial bloody cyst, which communicates through the narrow neck with the arterial lumen. Transvaginal ultrasound aided with color duplex capability is an accurate tool for assessment.

Keywords Uterine artery · Pseudoaneurysm · Postpartum hemorrhage · Transvaginal ultrasound

Sommario

Il presente studio descrive due casi di sanguinamento vaginale dovuto a pseudoaneurisma arterioso intrauterino. Entrambi i casi presentavano episodi intermittenti di abbondante sanguinamento vaginale; in un caso l'anamnesi era positiva per parto cesareo, nell'altro caso per revisione uterina. Lo pseudoaneurisma arterioso intra-uterino può essere causato da lesioni traumatiche alla parete dei vasi con successiva formazione di ematomi periarteriosi a rischio di rottura e sanguinamento. L'ecografia transvaginale con eco-color Doppler è uno strumento accurato per la valutazione di tale complicanza.

Introduction

Secondary postpartum hemorrhage was defined as bleeding per vagina, which occurs 24 h to 6 weeks after delivery, it can be caused by retained parts of conception, endometritis, and subinvolution of uterine placental bed; however, rare causes include traumatic vascular injury with subsequent arteriovenous fistula or uterine pseudoaneurysm [1].

Vaginal bleeding caused by uterine pseudoaneurysm can occur 1 week to 6 weeks after delivery and perhaps afterwards.

Intrauterine pseudoaneurysm occurs when there is traumatic injury to the arterial wall with subsequent formation of periarterial hematoma; the hematoma liquefies with time leading to the formation of thin-wall cavity showing arterial blood flow inside.

The uterine pseudoaneurysm was rarely observed after cesarean section, uterine myomectomy, and after uterine curettage, when it ruptures may lead to life-threatening vaginal bleeding [2].

Cases presentation

The current work presents two cases which were diagnosed with a uterine pseudoaneurysm.

Case number I

26-year-old female, gravida 1 para 1, was delivered by cesarean section since 60 days and was complaining of heavy vaginal bleeding for 10 days before attending to ultrasound exam.

The patient was anemic with hemoglobin concentration 7 g/dl. Serum β -hCG level was 1100 mIU/ml.

The patient was examined by transvaginal ultrasound assisted with color Doppler and pulsed Doppler capabilities

✉ Ashraf Talaat Youssef
ashraftalaat1@yahoo.com

¹ Department of Radio Diagnosis, Faculty of Medicine,
Fayoum University, Faiyum, Egypt

and the results of ultrasound exam revealed small oblong shape cyst measuring 1.5×1.4 cm seen in cervico-corporeal junction close to the scar of cesarean section showing bidirectional arterial blood flow of high velocity, low resistant pattern suggesting an intra uterine pseudoaneurysm. The bloody cyst showed radiating small vessels from its periphery (Fig. 1a–c).

After 48 h, the patient had suffered from severe vaginal bleeding, the hemoglobin concentration was dropped to 3 g/dl and was admitted to hospital and received a blood transfusion.

The patient was planned to perform surgical ligation of the internal iliac arteries; however, the vaginal bleeding had stopped without surgical intervention and patient condition improved after conservative management.

Follow-up transvaginal ultrasound on the second day of hospital admission had revealed no aneurysm observed with a small hyperechoic area in place suggesting recent clot/thrombotic occlusion.

Case number 2

30-year-old female gravida 3 para 2 was complaining of intermittent attacks of irregular, heavy vaginal bleeding, which commenced 10 days after miscarriage and subsequent uterine curettage; hemoglobin concentration was 6 g/dl; serum B-hCG level was 1180 mIU/ml.

The patient was attended to the ultrasound clinic to perform transvaginal color duplex exam, which revealed intrauterine fundal thin-wall cyst measuring 2.8×2.4 cm seen compressing the fundal surface of the endometrium and showing bidirectional high velocity, low resistant arterial flow pattern suggesting of intrauterine pseudoaneurysm (Fig. 2a–c).

The patient was admitted to hospital and was subjected to surgical hysterectomy.

Discussion

Arterial pseudoaneurysm is the formation of periarterial bloody cyst that communicates with the arterial lumen through a narrow neck. Color duplex assessment will show bidirectional (to and fro sign), high velocity, low resistant flow pattern with marked turbulence at the neck of pseudoaneurysm [3].

The arterial pseudoaneurysm differs from true aneurysm, because its walls formed of only one or two layers with respect to the three layers of arterial walls and the presence of narrow neck [4].

Uterine pseudoaneurysm is a lot more common than true aneurysm, and is very rare and is caused by traumatic injury to the uterine artery branches supplying the uterus and was

observed after cesarean section, myomectomy, or after a dilatation and curettage [5].

Uterine pseudoaneurysm can be differentiated from other vascular causes that lead to pervaginal bleeding as intrauterine arteriovenous fistulas or malformations which can be caused either with traumatic injury to the uterus or can be congenital and are due to an abnormal communication between the myometrial arteries and the myometrial venous plexus and during color duplex assessment were characterized by multiple dilated vascular channels showing high velocity, turbulent, low resistant flow of the arterial side of arteriovenous fistula and pulsatile venous flow pattern of myometrial venous plexus [4, 6].

In cases with uterine pseudoaneurysm, bleeding per vagina did not occur immediately after trauma but was presented after a delay of time; in one case with the small pseudoaneurysm, it exceeded the time limits of the secondary postpartum hemorrhage (6 weeks) as it occurred after 50 days from the time of delivery and in the other case with large pseudoaneurysm was presented after 10 days from the uterine curettage; and this may create a relationship between the size of pseudoaneurysm and the onset of bleeding.

The delay in the onset of bleeding can be explained by the mechanism of formation of pseudoaneurysm which begins with the formation of hematoma, which takes time to liquefy and acquires a wall to form a pseudoaneurysm.

The bleeding in both cases was intermittent and heavy which cannot be explained by pseudoaneurysmal rupture which will lead to severe life-threatening hemorrhage with subsequent vanishing of the aneurysm, but can be explained by rupture of the small arcuate or spiral arteries near the aneurysm or the small veins draining the pseudoaneurysm subsequent of high velocity and larger volumes of blood flow, they received from the pseudoaneurysm which acts like sac accumulating and then releasing blood from its lumen. Uterine pseudoaneurysm may cause elevation in β -hCG serum levels as it may contain residual decidual tissue or chorionic tissue in its walls [7].

Pseudoaneurysm rupture can lead to severe hemorrhage and rupture may occur spontaneously or subsequent of vaginal examination or violent intercourse. In one of the two cases showing small pseudoaneurysm, spontaneous cure occurs after rupture and subsequent thrombosis.

Superficially situated arterial pseudoaneurysm can be managed by applying gradual external compression guided by color duplex ultrasound till no color flow observed inside the aneurysm for 15 min and then release and the cycle repeated till no color flow observed inside the pseudoaneurysm after release of compression. The reported success rate ranged from 71 to 93% [8, 9].

Ultrasound-guided injection of thrombin into the lumen of the pseudoaneurysm is another effective method for treating of arterial pseudoaneurysm induced by catheterization

Fig. 1 **a** Transvaginal color duplex ultrasound showing small cyst 1.4×1.4 cm with color flow inside and thick endometrial cavity echo. **b** Transvaginal color Doppler ultrasound showing bidirectional flow (C) and power Angio showing radiating small vessels from the periphery of pseudoaneurysm. **c** Transvaginal color Angio and pulsed Doppler assessment showing low resistant flow inside the pseudoaneurysm and from the radiating vessels joining the aneurysm

Fig. 2 **a** Transvaginal ultrasound showing large irregular cyst at the uterine fundus with blood flow inside by color Angio. **b** Transvaginal color duplex, showing bidirectional low resistant flow inside the pseudoaneurysm. **c** Transvaginal color Doppler showing bidirectional flow inside the pseudoaneurysm with dilated nearby myometrial vessels

with reported success rate ranging from 95 to 100% and reported complications ranging from 0 to 4% which includes allergy to thrombin and embolization to the main arterial

tree [10]. Both methods were not tried to manage uterine pseudoaneurysm.

Applying external compression for about 15 min through the vaginal probe or assisted by external manual compression may look technically difficult and carries the risk that may induce pseudoaneurysmal rupture, also not suitable for large pseudoaneurysm or pseudoaneurysms that persist for longer time as these pseudoaneurysms acquire with time endothelial lining and became resistant for thrombogenesis.

Injection of thrombin guided by transvaginal ultrasound in spite of not tried seems to be an effective method with little complications compared with the currently used methods for treating uterine pseudoaneurysm. The risk of allergy can be minimized with injection of anti allergic drugs and corticosteroid prior to the procedure and the risk of embolization is remote due to the narrow neck of the aneurysm and the targeted injection into the only visible cystic swelling with blood flow located inside the uterus.

The currently used methods to treat uterine pseudoaneurysms are surgical ligation of internal iliac arteries and angiographic embolization to preserve future fertility or hysterectomy.

Embolization or surgical ligation of internal iliac arteries was preferred to be bilateral to overcome the possibility that pseudoaneurysm was fed by the contralateral uterine artery or by extrauterine arteries [5, 11].

The routine use of transvaginal ultrasound to evaluate the possible cause of secondary postpartum hemorrhage should not depend on B-mode scanning, but should be accomplished with color or power Doppler evaluation, especially when an intrauterine cyst was observed during the B-mode assessment to rule out the possibility of uterine pseudoaneurysm or arteriovenous fistula as a cause of bleeding.

Conclusion

Transvaginal ultrasound assisted with color and power Doppler capabilities should be used in the routine assessment of secondary postpartum hemorrhage and vaginal bleeding that persists after uterine operative procedures, to rule out the possibility of traumatic vascular injury.

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Compliance with ethical standards

Conflict of interest The author declares that he has no conflict interest.

Ethical approval All procedures performed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975 (revised version of 2000) (5).

Informed consent All patients provided written informed consent to the enrollment in the study and to the publication of information that could potentially lead to their identification.

References

1. Khong TY, Khong TK (1993) Delayed postpartum hemorrhage: a morphologic study of causes and their relation to other pregnancy disorders. *Obstet Gynecol*. 82:17–22 (**PubMed**)
2. Chitra TV, Panicker S (2011) Pseudoaneurysm of uterine artery: a rare cause of secondary postpartum hemorrhage. *J Obstet Gynaecol India* 61(6):641–644. <https://doi.org/10.1007/s13224-011-0096-6>
3. Monzer M, Yousef A, Wiese JA et al (1988) The to and fro sign. *Am J Roentgenol*. 150:632–634 (**PubMed**)
4. Nanjundan P, Rohilla M, Raveendran A, Jain V, Khandelwal N (2011) Pseudoaneurysm of uterine artery: a rare cause of secondary postpartum hemorrhage, managed with uterine artery embolisation. *J Clin Imaging Sci* 1:14. <https://doi.org/10.4103/2156-7514.76692>
5. Kwon JH, Kim GS (2002) Obstetric iatrogenic arterial injuries of the uterus: diagnosis with US and treatment with transcatheter arterial embolization. *Radiographics* 221:35–46 (**PubMed**)
6. Youssef AT (2015) Endosonography of benign myometrium cysts and cyst-like lesions. *J Ultrasound* 18:213–222. <https://doi.org/10.1007/s40477-014-0142-1>
7. Mou Y, Xu Y, Hu Y, Jiang T (2014) Giant uterine artery pseudoaneurysm after a missed miscarriage termination in a cesarean scar pregnancy. *BMC Womens Health* 14:89. <https://doi.org/10.1186/1472-6874-14-89>
8. Cheung YC, Wan YL (1997) Peripheral arterial pseudoaneurysm treated by ultrasound-guided compression. *Postgrad Med J*. 73(864):651–652 (**PMCID: PMC2431474**)
9. Rahil MA (2018) Successful treatment of a venous pseudoaneurysm in a brachio basilic fistula using ultrasound-guided manual compression: two case reports. *J Ultrasound*. <https://doi.org/10.1007/s40477-018-0280-y>
10. Schneider C, Malisius R, Küchler R et al (2009) A prospective study on ultrasound-guided percutaneous thrombin injection for treatment of iatrogenic post-catheterisation femoral pseudoaneurysms. *Int J Cardiol* 131(3):356–361. <https://doi.org/10.1016/j.ijcard.2007.10.052>
11. Burchell RC (1964) Internal iliac artery ligation: hemodynamics. *Obstet Gynecol* 24:737–739