



Imaging in Uterine Artery Pseudoaneurysm: A Rare, Potentially Fatal Cause of Secondary Post-partum Hemorrhage

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Abstract

Keywords

- ▶ uterine artery pseudoaneurysm
- ▶ Yin-yang sign
- ▶ secondary post-partum hemorrhage
- ▶ cesarean section

Secondary postpartum hemorrhage is one of the important cause of postpartum morbidity and mortality. Uterine artery pseudoaneurysm is a rare, potentially fatal but treatable cause of secondary post-partum hemorrhage. If not diagnosed timely, it can lead to life-threatening hemorrhage. We report the case of a 41-year-old woman who presented with profuse vaginal bleeding on 32nd day of cesarean section. On imaging a left uterine artery pseudoaneurysm was found in the uterine wall with blood clots in the uterine cavity. Patient was managed with aggressive fluid resuscitation and immediate interventional radiology procedure of selective embolization of pseudoaneurysm. High index of suspicion is needed to search for rare vascular causes like pseudoaneurysm.

Introduction

Postpartum hemorrhage remains one of the major causes of maternal mortality. It occurs in fewer than 5% of all deliveries and accounts for approximately 15% of all maternal deaths.¹ Primary postpartum hemorrhage (PPH) is defined as hemorrhage that occurs within the first 24 hours of delivery. Uterine atony (approximately 70% of cases), retained placental fragments, genital laceration, uterine inversion or rupture, and coagulation disorders are the main causes of primary hemorrhage.² Vaginal bleeding starting after 24 hours delivery up to 6 weeks is defined as secondary postpartum hemorrhage.³ Important causes include retained products of conception, vascular injuries, sub-involution of the placental bed and endometritis.⁴

Pseudoaneurysm is rare but fatal cause of hemorrhage following cesarean section. Causes for pseudoaneurysm formation could be trauma to the uterine artery or its branches during cesarean section, and myomectomy.⁵ Pseudoaneurysm does not contain all three layers of vessels, differentiating it from true aneurysm. It may be asymptomatic but often presents with secondary postpartum hemorrhage.⁶

Ultrasound with Doppler imaging is the first imaging modality for secondary postpartum hemorrhage. On grayscale images, pseudoaneurysm will be seen as anechoic or hypoechoic lesion within the myometrium. On color Doppler images typical Yin-yang sign is seen within the lesion which reveals characteristic to-and-fro spectral waveform and it has been reported to have a diagnostic sensitivity of 95%.^{7,8} Minimally invasive intervention

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procedure like uterine artery embolization is safe and reliable technique with preservation of fertility.⁹

Case Report

We would like to report a case of a 41-year-old female patient, G3P2, who presented to emergency department of our hospital with profuse per vaginal bleeding, 32 days after cesarean section was done at outside hospital.

On per-abdominal examination cesarean section scar looked normal. On per vaginal examination blood clots were noted in cervix and vagina.

Management and Outcome

Patient was in hypovolemic shock with hemoglobin level of 7.8 g/dL and was managed with rigorous fluid resuscitation and blood transfusion. Ultrasound was done on emergency basis to rule out retained products of conception. On trans-abdominal and trans-vaginal ultrasound scan, isoechoic to hyperechoic clots were noted in the endometrial cavity with no significant vascularity.

A well-defined cystic lesion measuring 2.6 × 1.9 cm was seen in the left lateral myometrium of the lower uterine segment at the lateral margin of echogenic cesarean section scar (► Fig. 1).

On color Doppler study the cystic lesion showed yin-yang sign with to and fro spectral waveforms (► Fig. 2), suggesting pseudoaneurysm probably arising from left uterine artery causing secondary postpartum hemorrhage. CT angiography was performed immediately which confirmed the findings. A well-defined arterial phase contrast enhancing lesion was seen in relation to left uterine artery (► Fig. 3).

Patient was then taken for Digital subtraction angiography. Left internal iliac angiogram was performed by transfemoral route, followed by selective catheterization of left uterine artery (► Fig. 4).

After confirming and identifying neck of pseudoaneurysm, superselective embolization of neck of pseudoaneur-

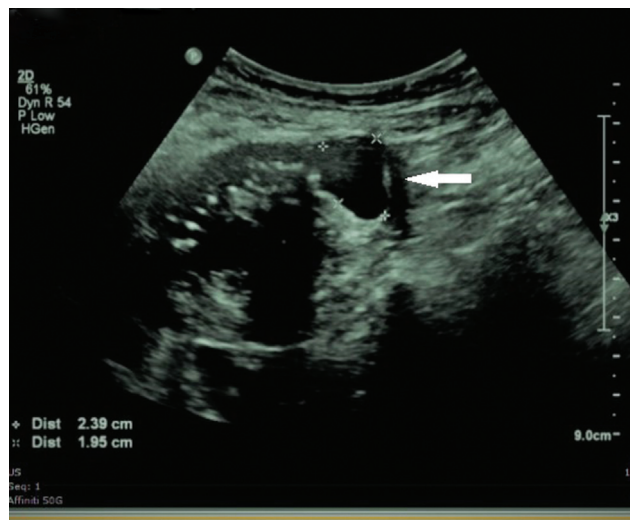


Fig. 1 Gray scale ultrasound image showing cystic lesion on left lateral wall of uterus (arrow) adjacent to echogenic scar.

ysm was performed with platinum coils (► Fig. 5). Clinically patient improved after the interventional procedure.

Post-embolization ultrasound images obtained on post procedure day 2 showed no color flow in the region of pseudoaneurysm suggesting complete occlusion (► Fig. 6).

Discussion

Postpartum period begins immediately after the delivery of the neonate and placenta and is considered to extend up to 6 to 8 weeks. During this period physiologic changes of pregnancy gradually revert to baseline.¹⁰

Imaging appearance of postpartum uterus is variable. Heterogeneously hyperechoic material is seen in the endometrial cavity even in 21% asymptomatic women for 2 weeks with physiological postpartum vaginal bleeding.¹¹

The most common cause of PPH is an atonic uterus, which fails to contract. Another important cause is retained products of conception (RPOC) which is defined as residual fetal or placental tissue remaining after delivery, miscarriage, or termination.¹⁰ In primary hemorrhage if RPOC is suspected,

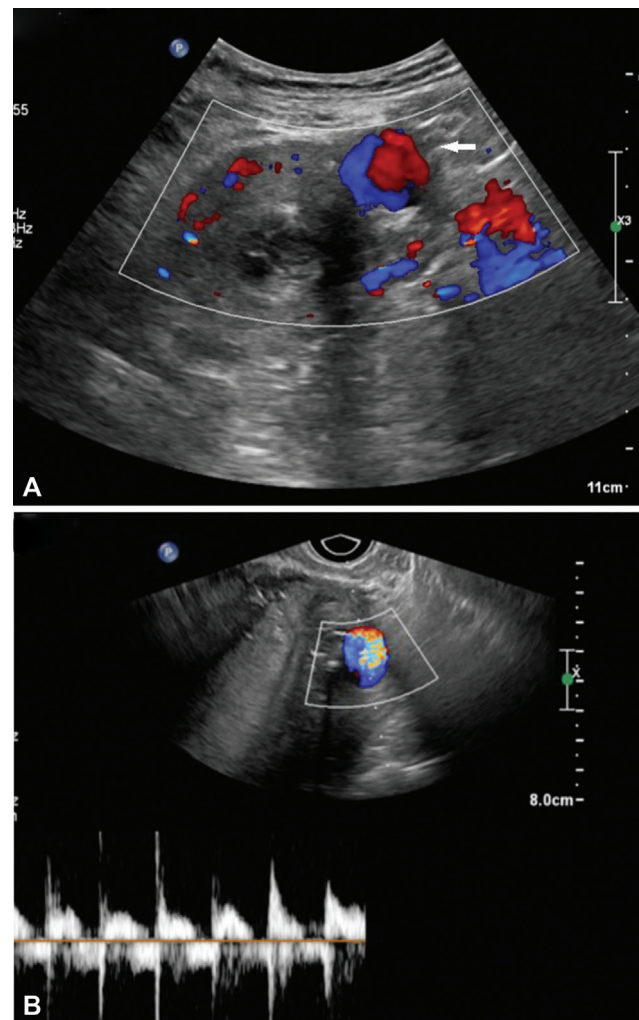


Fig. 2 (A) Color Doppler showing Yin-yang flow in the cystic lesion (arrow) therefore confirming the presence of pseudoaneurysm. (B) Doppler image showing to and fro pattern of waveform in the pseudoaneurysm.

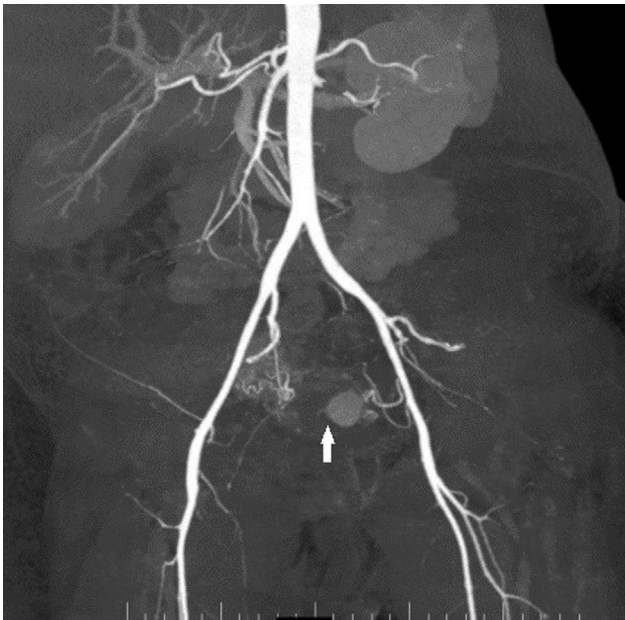


Fig. 3 Maximum intensity projection (MIP) images showing well-defined out-pouching (arrow) arising from tortuous left uterine artery suggestive of pseudoaneurysm.

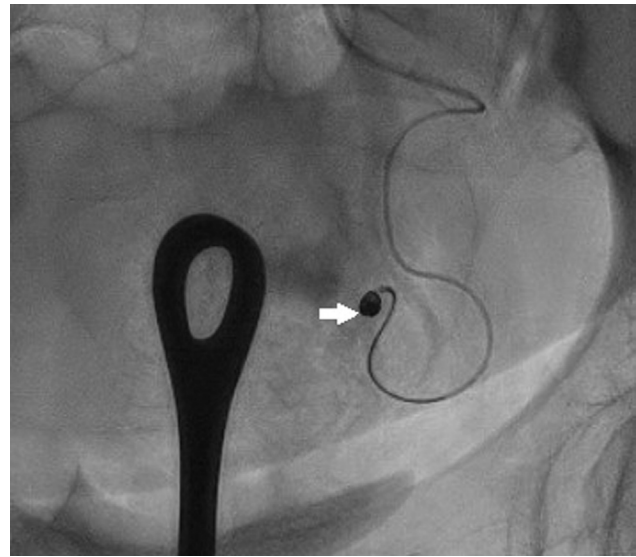


Fig. 5 Catheter angiography image showing platinum coil (arrow) in the region of neck of pseudoaneurysm.

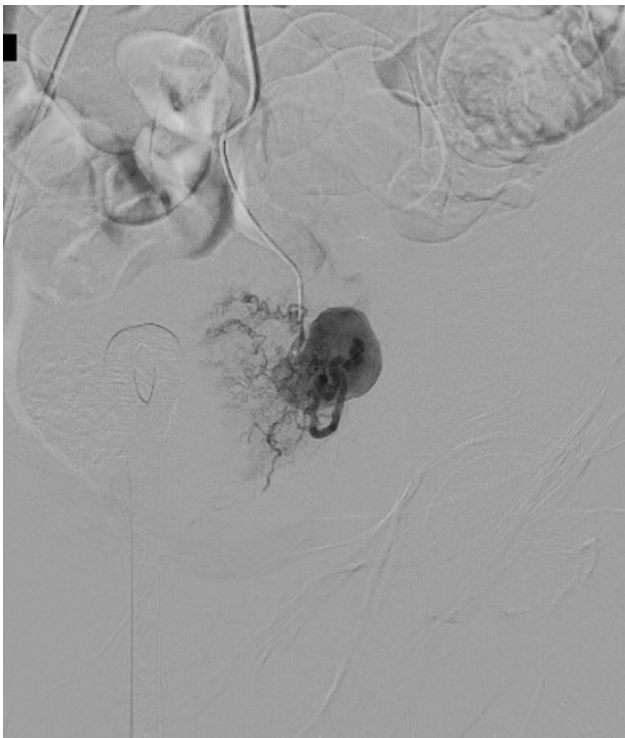


Fig. 4 Selective catheterization of left internal iliac artery showing contrast blush and pseudoaneurysm arising from the left uterine artery.

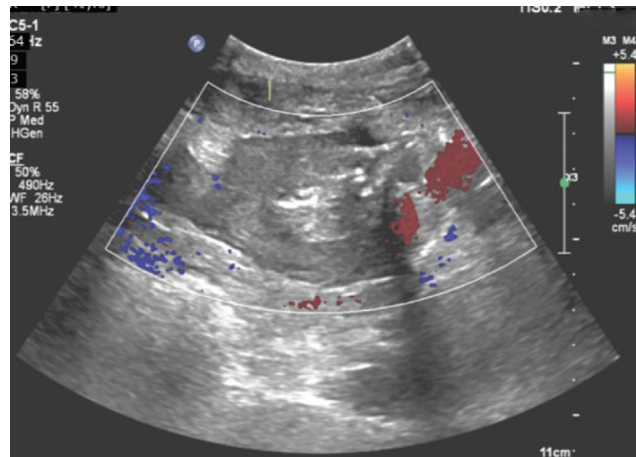


Fig. 6 Day 2 of post embolization, ultrasound, and color Doppler image showing no color flow in the region of pseudoaneurysm suggesting complete occlusion of pseudoaneurysm from the circulation.

it is treated without imaging. Ultrasound findings suggestive of the presence of an echogenic mass with increased color Doppler flow in the endometrium appear to be the most accurate sign of RPOC, with reported sensitivity and specificity of 79 and 89%, respectively.¹²

Uterine artery pseudoaneurysm is one of the important, potentially fatal but treatable cause of secondary postpar-

tum hemorrhage. Timely diagnosis with high index of suspicion is important to avoid dreaded complications of hemorrhage. Ultrasound with color Doppler imaging is first line of imaging in secondary postpartum hemorrhage to look for the etiology. Hypoechoic or anechoic lesion in myometrium with Yin-yang flow on color images which reveals to and fro spectral waveform pattern on Doppler study points toward uterine artery pseudoaneurysm with sensitivity of 95%.^{7,8} Higher imaging modalities like CT angiography is done for confirmation of findings. Digital subtraction angiography followed by superselective embolization of neck of pseudoaneurysm is treatment of choice in stable patients with preservation of fertility.⁹ Minimal invasive procedure can prevent more invasive and radical ways to treat secondary postpartum hemorrhage, like uterine artery ligation or hysterectomy.

In our case, on ultrasound imaging, along with endometrial clots, we saw well-defined cystic lesion in the myometrium, which pointed toward one of the rare vascular causes of postpartum hemorrhage but color Doppler pattern and angiography confirmed the diagnosis of pseudoaneurysm.

Conclusion

In cases of secondary postpartum hemorrhage, ultrasound is the first imaging investigation to look for the common etiologies. High index of suspicion is needed to search for rare vascular causes like AVM and pseudoaneurysm. Further imaging with cross-sectional studies may be required in certain cases. Minimally invasive treatment modalities available now a days help to avoid more radical surgeries like hysterectomy thus preserving fertility.

Conflict of Interest

None declared.

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