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Case Report

Embolization of a postcesarean pseudo-aneurysm of a uterine artery: A case report ☆☆☆

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ARTICLE INFO

Article history:

Received 10 November 2023

Revised 20 January 2024

Accepted 25 January 2024

Keywords:

Pseudoaneurysm of uterine artery

Postpartum hemorrhage

Morbidity

Doppler

Angiography

Embolization

ABSTRACT

Postpartum hemorrhage caused by a pseudoaneurysm of the uterine artery is suspected clinically in the case of abundant metrorrhagia. An ultrasound is performed, followed by further imaging modalities to confirm the diagnosis: CT scan, MRI, and angiography, the latter would also allow embolization. This is admittedly rare, however, since the pseudo aneurysm of the uterine artery is potentially fatal, it must be taken into account in the differential diagnosis of secondary postpartum hemorrhage, allowing adequate and rapid management. We report a case of pseudo aneurysm of the uterine artery, suspected clinically and confirmed by a CT scan, presenting as a secondary postpartum hemorrhage a few hours after delivery by cesarean section. It was eventually managed by embolization with excellent results several days after its onset when the cause was revealed. Angiographic embolization is an effective treatment for postpartum hemorrhage caused by pseudoaneurysm in stable patients. It should be considered before surgery in suitable cases.

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Introduction

Secondary postpartum hemorrhage (SPPH) (0.5% and 2%) is defined as any significant bleeding occurring between 24 hours and 6 weeks postpartum [1,2], its incidence has been reported to be 0.5%-2% [3]. Common causes include retained products of conception, sub-involution of the placental bed,

and endometritis. Rare causes include pseudoaneurysm of uterine artery, arteriovenous malformations, and choriocarcinoma. The management depends on the etiology and the severity of the bleeding [4].

These SPPH's are certainly rare, but remain as dangerous as primary hemorrhages. Especially when their diagnosis and therefore treatment is delayed, which is often the case.

☆ Acknowledgments: In memoriam, the authors pay tribute to the late Pr N. Boubendir, our esteemed former head of service, whose legacy continues to resonate in the work presented in this article. Despite the profound loss we feel in their absence, we celebrate the enduring impact of his leadership and dedication. This study has not been funded.

☆☆ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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<https://doi.org/10.1016/j.radcr.2024.01.076>

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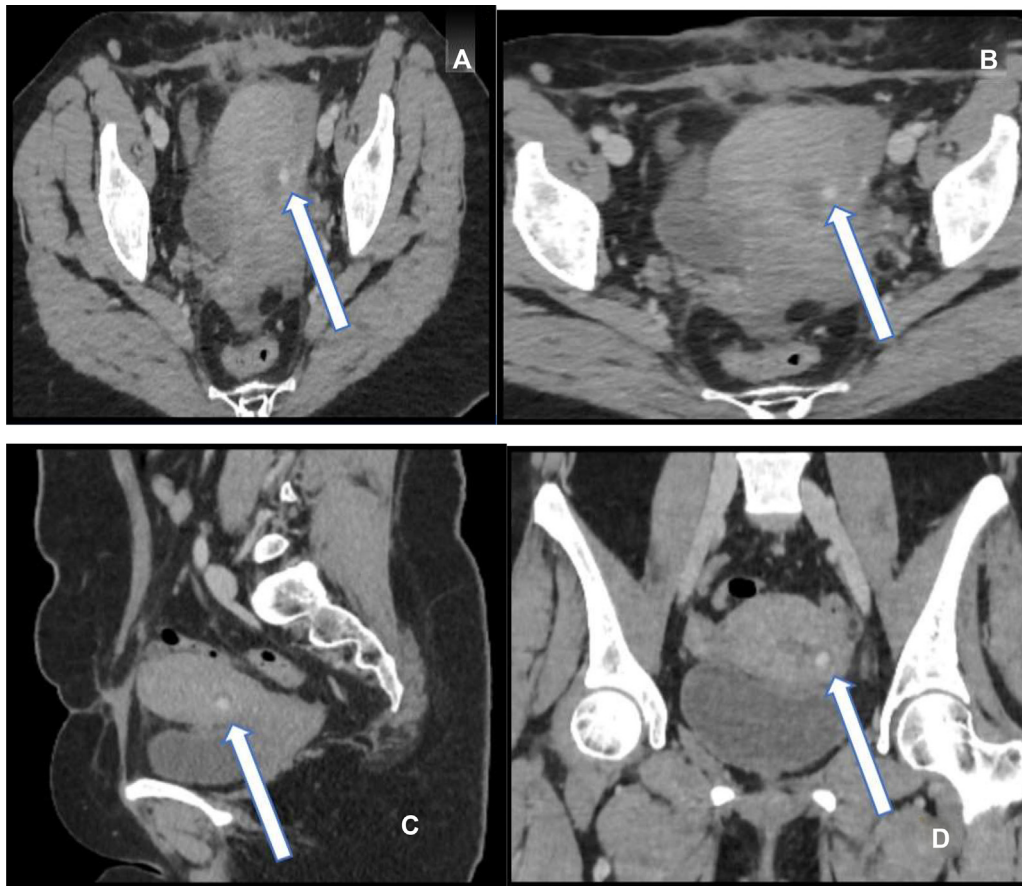


Fig. 1 – CT sections of the pelvis passing through the addition image corresponding to the pseudoaneurysm (white arrows) on axial (A) and (B), sagittal (C) and coronal (D) views.

Pseudoaneurysm is a condition in which the arterial wall is injured, followed by the formation of an abnormal arterial flow enclosed within a loose adventitial connective tissue [4].

We describe a case of secondary postpartum hemorrhage after cesarean section attributed to a pseudo aneurysm of the uterine artery.

Case report

A 35-year-old (G3C1A1) was hospitalized in the obstetrics and gynecology emergency unit at 36 weeks of gestation. In her history, we note a first vaginal-delivery of an 8-year-old child and a second delivery by cesarean section of a 4-year-old child currently both present good psychomotor developments. The patient who had gestational diabetes ended up having a cesarean section scheduled, allowing the birth of a newborn male weighing 2800 g. Early postpartum was marked by bleeding, motivating the Gynecology Obstetrics team to readmit the patient to the operating room. Obstetric maneuvers were carried and a Bakri balloon was placed. The patient responded well, and the bleeding stopped. At this stage, the patient had a hemoglobin of 11 g/dL.

On D13 the patient presented to the obstetric emergencies with vaginal bleeding. An assessment has been made initially revealing an anemia at 9 g/dL of hemoglobin. The patient received Venofer (Iron sucrose) to manage her anemia and a second Bakri balloon was placed.

Once again on D23, the patient found herself in the emergency room in a similar situation. This time, her hemoglobin was at 5.7 g/dL. The Ob/gyn made another attempt at hemostasis using a Bakri balloon, accompanied by a transfusion of red blood cells.

It was at this point of time, that our team of radiologists was solicited for an abdominal and pelvic CT scan. The CT scan was performed in helical mode with multiplanar reconstruction before and after contrast injection in the arterial and portal phase, using a GE 64 bars. The results showed a hyperattenuating (contrast-enhanced in the arterial phase) smooth-walled sac adjacent to the left lateral wall of the cervico-isthmus region of the uterus in contact with a branch of the left uterine artery, roughly oval measuring $07 \times 09 \times 11$ mm (AP T \times W \times H), unmodified at the venous phase which confirmed the diagnosis of pseudo aneurysm of the left uterine artery (Fig. 1).

Arteriography was performed with right femoral access, followed by the catheterization of the left internal iliac artery. This confirmed the diagnosis, and allowed the super-selective

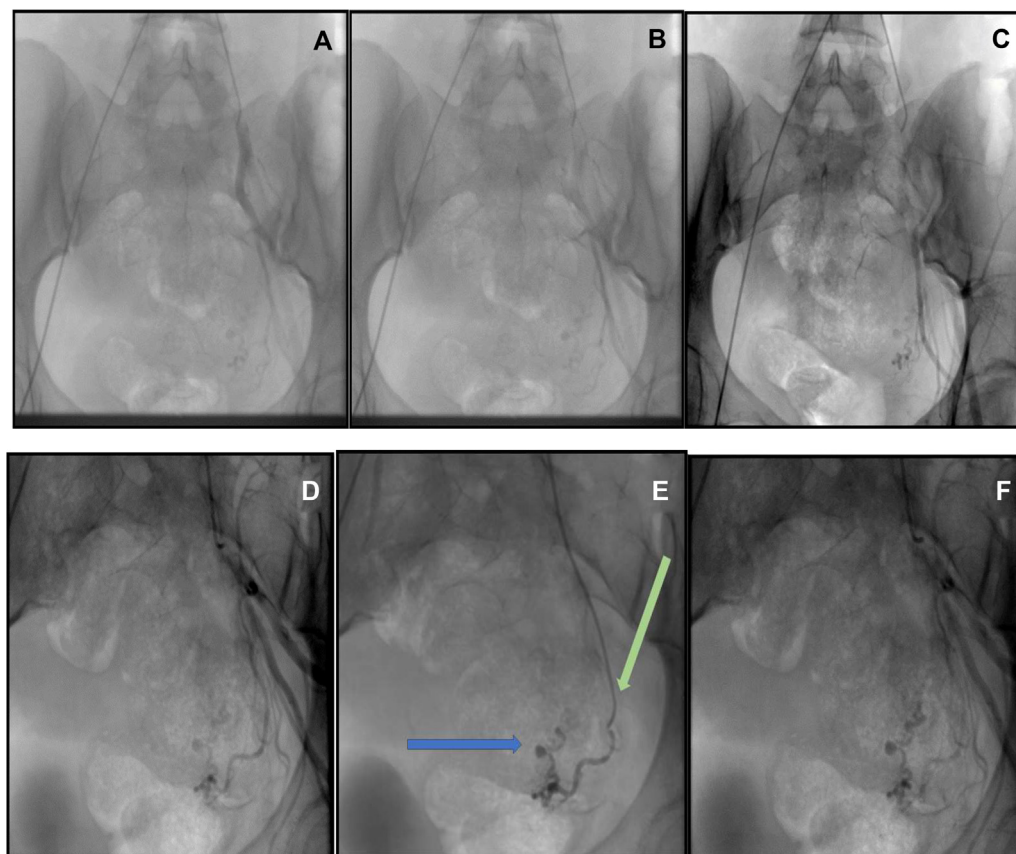


Fig. 2 – Angiography, catheterization of the left hypogastric artery (A), (B), (C), (D) and (F), showing the pseudoaneurysm (blue arrow) and the left uterine artery (green arrow) (E).

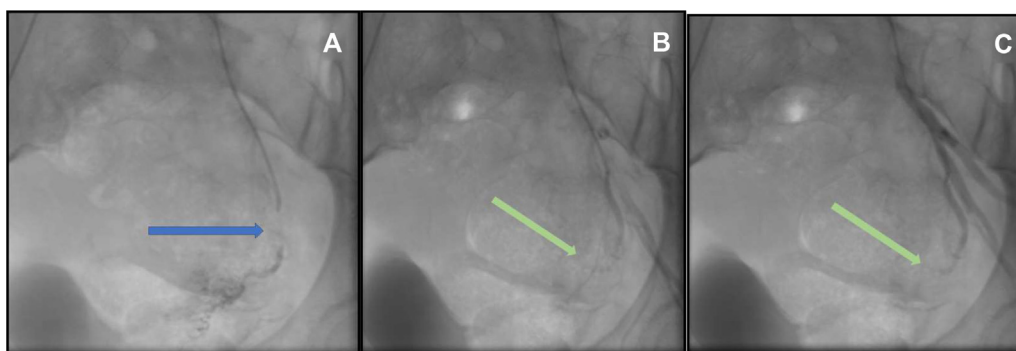


Fig. 3 – angiography, catheterization of the left uterine artery, with the release of Gelfoam (A) (blue arrow), then control after embolization (B) and (C) shows the disappearance of the pseudoaneurysm (green arrow).

catheterization of left uterine artery by a MPA catheter 4F, provided with a guide “Terumo,” and embolization of its distal part, just upstream of the pseudo aneurysm, by gel foam slurry (Fig. 2).

The final control showed an obstruction, in the distal part of the left artery uterine that initially carried the pseudoaneurysm.

The patient was discharged 4 days later, and no complications were reported with the bleeding stopping within the week following our intervention (Fig. 3).

A CT scan was performed on D10 postembolization. The results showed the complete disappearance of the pseudoaneurysm and confirmed the success of our intervention (Fig. 4).

Discussion

Postpartum hemorrhage remains a leading contributor to maternal mortality. Secondary postpartum hemorrhage is char-

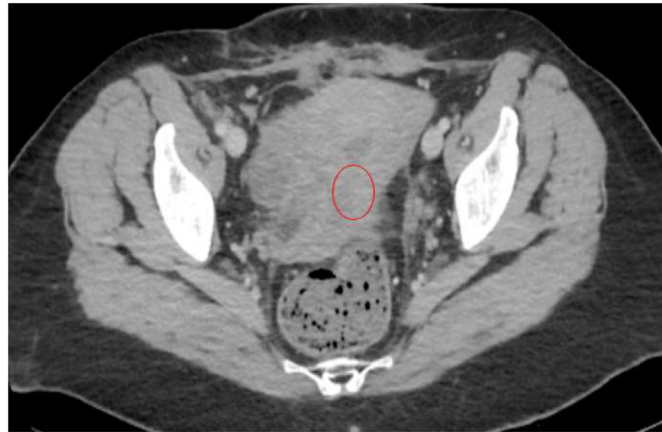


Fig. 4 – CT pelvic scan with contrast showing a complete disappearance of the pseudo aneurysm (red circle reveals the previous location of the pseudoaneurysm).

acterized by excessive bleeding occurring between 24 hours and up to 6 weeks after childbirth, with a higher incidence typically between the 8th and 14th day. Uncommon causes include pseudoaneurysm of the uterine artery, arteriovenous malformations, and choriocarcinoma.

When the most common causes have been ruled out, pelvic angiography may be performed. The embolization of the uterine artery can then be carried out to control the bleeding [4].

Pseudoaneurysms are generally secondary to vascular injury secondary to trauma [5]. Cesarean section is the most often found cause, some factors (difficult fetal extraction, creation of a hemostatic point near the uterine artery or traumatic extension of the hysterotomy) can increase the risk of the arterial lesions which are responsible for pseudoaneurysm.

A true aneurysm has all three layers of the arterial wall, whereas a pseudoaneurysm does not have all 3 layers of the arterial wall. The difference between a pseudoaneurysm and a true aneurysm lies in the fact that the latter is a focal dilation of an artery whose wall is composed of its 3 tunics (intima, media, adventitia) [6]. The severity of the pseudoaneurysm lies in the fragility of its wall which is composed of a single fibrous coating. Which makes it delicate to rupture with increased blood pressure and physical activity [4].

In the diagnosis of a pseudoaneurysm of the uterine artery, as with any vascular malformation arising from a digestive or pelvic artery, ultrasound coupled with color and pulsed Doppler plays a crucial role in determining its origin, size, circulation, and providing more information on the risk of rupture as well as preinterventional assessment.

Although sectional imaging holds a more significant place due to its spatial resolution and precise reproducibility, Doppler ultrasound remains a valuable exploratory tool.

However, Doppler ultrasound of digestive and pelvic arteries is limited by various physical elements that can affect the expected results, primarily represented by digestive gases, a potential massive adipose layer, or substantial lesion depth.

In the context of this examination, an aneurysmal pathology typically presents as a saccular vascular addition image, often with abrupt contours due to the absence of intima surrounding the false aneurysm [6]. Additionally, the frequency of mural thromboses contributes to this appearance. Arterial circulation is assessed using color Doppler, showing a double-color coding explained by the bidirectional flow (ying-yang sign). Turbulent or alternating flow can be observed on pulsed Doppler, described as “orthograde in systole but retrograde in diastole”.

The differential diagnosis of pseudo aneurysm includes acquired arteriovenous malformations (AVMs), arteriovenous fistulas, and direct vessel rupture.

Acquired AVMs consist of multiple small arteriovenous fistulas between intramural arterial branches and the myometrial venous plexus [7,8].

Acquired AVMs occur more commonly following uterine surgery or trauma to the uterus. Color flow Doppler demonstrates an aliasing, and arterialized venous flow on spectral Doppler evaluation [5].

The embolization of these uterine arterial pseudoaneurysms now holds a prominent place in their management. Indeed, its advantages outweigh the rare potential drawbacks and are primarily represented by a reduction in morbidity, the ability to localize the bleeding site and provide more distal occlusion than surgical ligation, and the preservation of future fertility compared to hysterectomy [8].

Technically, a common femoral approach, either homolateral or contralateral, will be used, although some authors may prefer a radial approach. After the placement of a valve introducer using the Seldinger technique, catheterization of the uterine arteries will be performed using a Cobra catheter carried on a hydrophilic guide. The opacification of these arteries will identify the pseudoaneurysm and its supplying artery, while also searching for other vascular anomalies that may need treatment.

A supra-selective progression of the artery supplying the vascular anomaly with a microcatheter will initiate exclu-

sion treatment using coils followed by absorbable gelatin fragments.

A final check performed distally via the microcatheter and then more proximally at the level of the introducer sheath should demonstrate the exclusion of the aneurysmal sac and the absence of complications.

Conclusion

Finally, it should be emphasized that for a woman who presents to the emergency room with unexplained vaginal bleeding after a cesarean section, the Ob-Gyn should think of a pseudoaneurysm as a possible cause, because it constitutes a potentially fatal complication and should be taken into account in the diagnosis of differential postpartum hemorrhages.

Thus, it will quickly be necessary to request a pelvic ultrasound associated with a Doppler. And in case the diagnosis is still uncertain, further imaging should be used, in particular arteriography, which has a dual diagnostic and therapeutic role for the pseudo-aneurysm of the uterine artery.

Patient consent

Complete written informed consent was obtained from the patient for the publication of this study and accompanying images.

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