

# PITFALLS TO AVOID WHILE EMBOLIZING PSEUDOANEURYSMS OF THE UTERINE ARTERY- A CASE SERIES

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## Aim

To emphasize the need for bilateral uterine artery embolization in cases of unilateral pseudoaneurysms, due to the rich collateral blood supply of the uterus.

## Introduction

One of the major determinant of maternal mortality is postpartum hemorrhage.<sup>1</sup> Secondary postpartum hemorrhage is massive bleeding initiating 24 hours after delivery up to 6 weeks postpartum. One of the rare causes of secondary postpartum hemorrhage is uterine artery pseudo.<sup>2</sup>

## Case Presentation

### CASE 1:

A 22 years old gravid 1 and para 1 presented with 3 episodes of heavy per vaginal bleeding after C-section. She had a dilatation and curettage (D&C) followed by negative exploratory laparotomy. Due to her young age hysterectomy was avoided and was referred to us being the regional IR tertiary referral center.

She underwent screening ultrasound and contrast enhanced CT abdomen and pelvis were performed, which showed the presence of pseudoaneurysm within the inner uterine myometrium at the site of a myometrial defect. Selective catheterization of the uterine artery was done with a micro-catheter clearly defining pseudoaneurysm. Embolization of uterine artery was done using polyvinyl alcohol (PVA) particle

ranging from 355-500 microns. Final angiogram showed no filling of aneurysm from both internal iliac arteries.

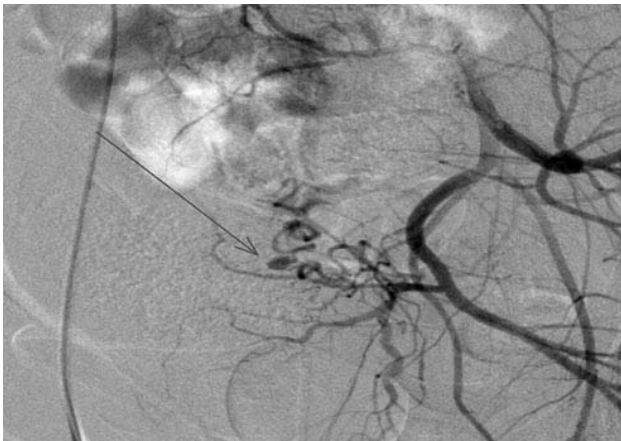
Two weeks later the patient had a further episode of bleeding. An MRI of the pelvis was done which showed myometrial defect and non-visualization of previous pseudoaneurysm. However a prominent vessel adjacent to the myometrial defect was noted. Reperfusion of the pseudo aneurysms was seen from the contralateral side not apparent at the end of initial



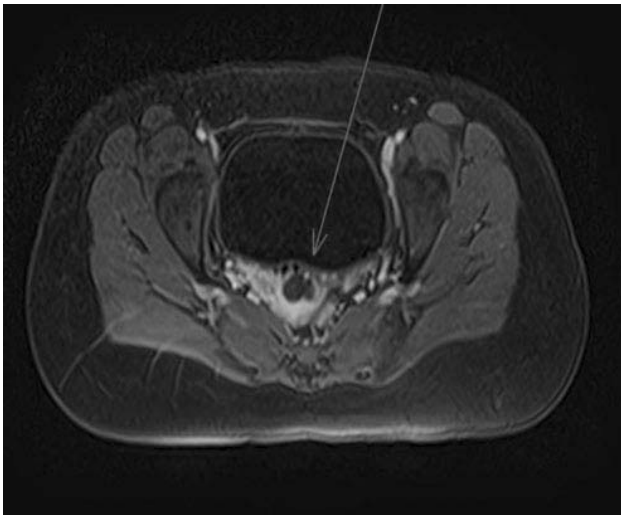
**Figure 1(a):** 23 years old female vascular angiography axial view showing asymmetrically prominent small bunch of vessels in wall of uterine body near endometrial cavity representing pseudoaneurysm.

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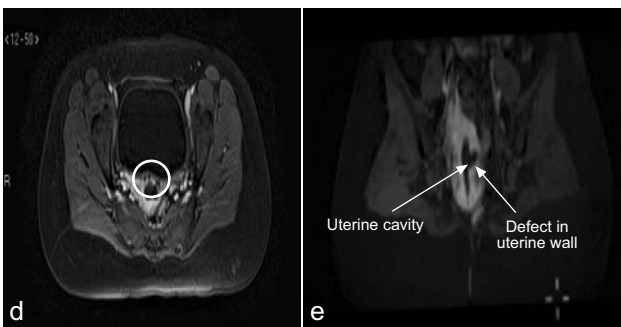
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**Figure 1b:** Selective catheterization of left uterine artery. Completion angiogram showed near flow stasis and disappearance of prominent and tortuous uterine artery branches.



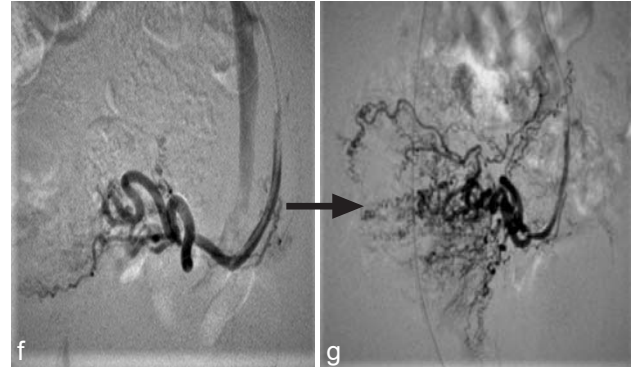
**Figure 1c:** 2 weeks later further episode of bleeding which was investigated with MRI showing pseudo-aneurysm.



**Figure 1d,e:** 23 years old female MRI pelvis post contrast T1 axial and coronal and T2 sagittal images showing pseudo-aneurysm close to the anterior aspect of uterine wall defect.

embolization. Repeat catheter angiogram was performed and empirical gelfoam embolization of contralateral artery was performed. Post-embolization

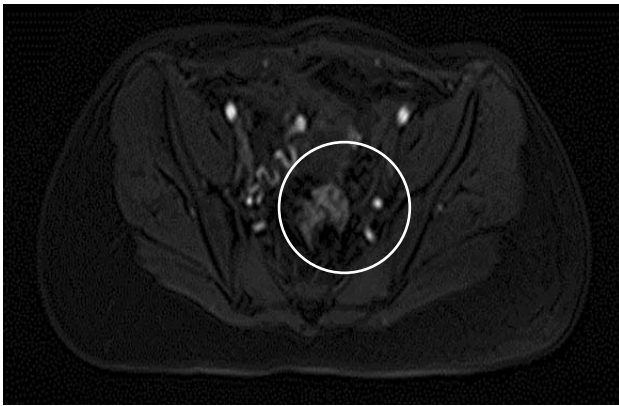
angiography ensured complete occlusion of vessels. No further bleeding episodes or other adverse sequelae were reported at a subsequent follow-up in 3 months and 10 months.



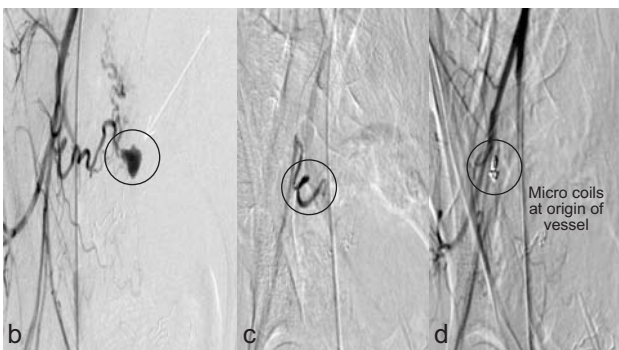
**Figure 1f,g:** 23 years old female, after selective catheterization of the artery, DSA showing extensive collateralization from the contralateral side, likely causing persistent bleeding. Gelfoam (temporary embolization agent) used to successful bilateral uterine artery embolization leading to control of bleeding.

#### CASE 2:

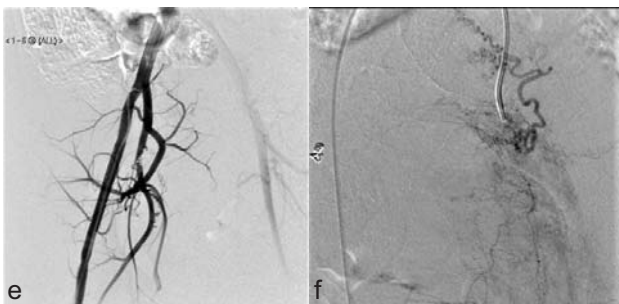
A 27 years old patient who underwent an emergency lower segment C-section presented after 2 weeks with recurrent episodes of vaginal bleeding. Her Hb was as low as 5.2 g/dl. On clinical examination her surgical scar was found to be healthy. Stabilization with crystalloids and five units of packed red packed cells was attained. Cross sectional imaging reliably diagnosed pseudo-aneurysms with active bleeding seen on catheter angiogram. A micro-catheter was used to access the uterine artery and embolization was performed using PVA particle ranging in size from 500-700 microns till flow stasis was achieved. Post-embolization angiogram showed no filling of the pseudoaneurysm from either side. Patient however presented later the same day with further bleeding and was taken to the IR suite again. Angiogram showed increased cross filling from the contralateral uterine artery, which was not apparent at the end of the first embolization procedure. Remaining uterine artery was embolized using a mixture of PVA and gelfoam slurry. No further bleeding episodes were reported and she was subsequently discharged. Gynecological follow-up at 18 months in clinic reported no adverse issues.



**Figure 2a:** 27 years old female, postcontrast T1 axial view showing serpiginous vessels feeding a small pseudoaneurysm.



**Figure 2b:** Pelvic arteriogram demonstrates the pseudoaneurysm arising from the right uterine artery. 5 Fr uterine artery catheter used to catheterize the right uterine artery. Microcatheter was advanced into the uterine artery. PVA particle sized 500-700 microns were used to embolize right uterine artery. **Figure 2c:** Followed by micro coils. **Figure 2d:** Making sure stasis is achieved.



**Figure 2e:** Angiogram demonstrating small normal uterine artery and tiny residual collaterals along the pseudoaneurysm, previously embolized. Microcatheter used to catheterize the right uterine artery, embolization performed. **Figure 2f:** Post embolization angiogram showed very slow flow in the uterine artery.

## Discussion

Major determinant of maternal mortality is postpartum hemorrhage<sup>1</sup> and one of the rare causes include pseudo aneurysm. Uterine artery pseudo aneurysm

is a rare but potentially life threatening post-operative complication. Injury to uterine artery may occur during cesarean section, traumatic deliveries, using an intrauterine device, manual placental removal or dilatation and curettage (D&C).<sup>2,3</sup> Ashraf reported two cases in 2018, with intermittent heavy vaginal bleeding subsequent to intrauterine arterial pseudoaneurysm each with a history of cesarean section and curettage respectively.<sup>4</sup> This high risk complication results in heavy, uncontrolled persistent vaginal bleeding typically presenting as delayed complication of prior intervention.<sup>1,5,6</sup> Immediate interventional therapy is needed to treat such catastrophic complication. Traditionally postpartum hemorrhage cases are treated with hysterectomy or bilateral internal iliac artery ligations, missing the diagnosis of aneurysm or arteriovenous malformation.<sup>7</sup> Hysterectomy is the most common treatment modality. Recently a minimally invasive uterus preserving treatment modality i.e. trans-arterial embolization (TAE) became the gold standard.<sup>8</sup> Selective arterial embolization of uterine arteries is a safe and effective means of controlling secondary postpartum hemorrhage.<sup>9</sup> The first successful case of selective arterial embolization in 1979 reported by Brown et al. It was performed for extra-uterine hematoma after few failed surgical attempts to achieve hemostasis.<sup>10</sup> Though the choice of therapy is a multifactorial decision depending on risk of hemorrhage severity and its possible consequences. Fully informed adverse outcomes related to embolization procedure including lower extremities thromboembolism or vesicovaginal fistulous formation. This decision varies for every individual patient depending on shape, size, presentation and future fertility plans. Among them the most attractive and significant predictor is tubal patency for further reproduction.<sup>11</sup> The common practice is ligation of unilateral affected artery, but similar to our study, Cooper et al reported in 2004 a patient who developed recurrent vaginal bleeding after embolization. This bleeding was rather from a collateral from the contralateral uterine artery feeding the same false aneurysm. After initial embolization, possibility of redistribution of blood or neovascularization due to induced hypoxia allows recurrent bleeding from contralateral side.<sup>12</sup> Uterine artery embolization due to similar recurrence of vaginal bleeding which infact is not a failed embolization rather collateral supply the previously treated pseudo aneurysm.

Similarly, Descargues reported 4 out of 6 woman who achieved hemostasis following unilateral embolization while prophylactic bilateral uterine arteries embolization was performed in rest of the two women.<sup>13</sup> According to a study in 2011, uterine artery embolization is considered a safer than hysterectomy and a reliable alternative to it.<sup>14</sup> According to Sharma et al, trans-catheter uterine artery embolization can be safely used after pelvic angiography, and is considered a conservative treatment of choice for uterine artery malformation. She described a case where a patient of 25 years presented with bleeding per vaginal for a month. To preserve her fertility bilateral uterine arteries were embolized.<sup>7</sup> According to a study in 2011, Chitra et al narrated that five women post lower segment cesarean section (LSCS) after 3<sup>rd</sup> to 6<sup>th</sup> postpartum weeks presented with severe secondary postpartum hemorrhage (PPH). Angiography revealed psuedoaneurysm and embolization was done.<sup>14</sup>


Therefore from our experience and literature review, pseudo-aneurysm consideration in unexplained vaginal bleeding in a woman especially after C-section delivery is crucial. Within the limitation of scanty data, bilateral uterine artery for post-intervention vaginal hemorrhage appears to have no increased catastrophic side effect on future fertility, but in fact more effective than that from unilateral embolization.<sup>1</sup>

## Conclusion

The uterus has a rich blood supply with good collateral flow and cross filling, especially in postpartum period. Embolization of the target vessel on one side is often not sufficient and both uterine arteries must be embolized in the same setting to prevent re-bleeding.

## References

1. Nanjundan P, Rohilla M, Raveendran A et al. Pseudoaneurysm of uterine artery: a rare cause of secondary postpartum hemorrhage, managed with uterine artery embolisation. *J Clin Imaging Sci.* 2011; **1**: 14.
2. Kuwata T, Matsubara S, Kaneko Y et al. Asymptomatic uterine artery pseudoaneurysm after cesarean section. *J ObstetGynaecol Res.* 2010; **36**: 405-10.
3. Nagayama C, Gibo M, Nitta H et al. Rupture of pseudoaneurysm after vaginal delivery successfully treated by selective arterial embolization. *Arch Gynecol Obstet.* 2011; **283**: 37-40.
4. Youssef AT. Intrauterine arterial pseudoaneurysm, a rare cause of per vaginal bleeding. *J Ultrasound.* Dec 2018; **21(4)**: 333-7.
5. Jain J, O'Leary S, Sarosi M. Uterine artery pseudoaneurysm after uterine cervical conization. *Obstet Gynecol.* Feb 2014; **123(2)**: 456-8.
6. Ciebiera M, Slabuszewska-Józwiak A, Zareba K, Jakiel G. Management of uterine artery pseudoaneurysm: advanced ultrasonography imaging and laparoscopic surgery as an alternative method to angio-computed tomography and transarterial embolization. *Videosurgery and Other Miniinvasive Techniques.* 2017; **12(1)**: 106-9.
7. Sharma N, Ganesh D, Devi L, Srinivasan J, Ranga U. Prompt diagnosis and treatment of uterine arcuate artery pseudoaneurysm: a case report and review of literature. *J ClinDiagn Res.* Oct 2013; **7(10)**: 2303-6.
8. Delotte J, Chevallier P, Benoit B, et al. Pregnancy after embolization therapy for uterine arteriovenous malformation. *FertilSteril.* 2006; **85**: 91-6
9. Jean-François, Marc B, Alain FLB, Marc T, Antoine K, Nadia B, Serge U, and Frank B. Is Selective Embolization of Uterine Arteries a Safe Alternative to Hysterectomy in Patients with Postpartum Hemorrhage? *American Journal of Roentgenology.* 2001; **177(1)**: 145-9.
10. Brown BJ, Heaston DK, Poulson AM, Gabert HA, Mineau DE, Miller FJ Jr. Uncontrollable postpartum bleeding: A new approach to hemostasis through angiographic arterial embolization. *ObstetGynecol* 1979; **54**: 361-5.

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11. Wdowiak A, Wdowiak E, Stec M, Bojar I. Post-laparoscopy predictive factors of achieving pregnancy in patients treated for infertility. *Videosurgery Miniinv.* 2016; **11**: 253-8.
  12. Cooper, B., Hocking-Brown, M., Sorosky, J. et al. Pseudoaneurysm of the Uterine Artery Requiring Bilateral Uterine Artery Embolization. *J Perinatol* 2004; **24**: 560-2.
  13. Descargues G, Douvrin F, Gravier A, Lemoine JP, Marpeau L, Clavier E. False aneurysm of the uterine pedicle: an uncommon cause of postpartum haemorrhage after cesarean section treated with selective arterial embolization. *Eur J Obstet Gynecol Reprod Biol.* 2001; **97**: 26-9.
  14. Chitra, TV, PanickerS. Pseudoaneurysm of Uterine Artery: A Rare Cause of Secondary Postpartum Hemorrhage. *J ObstetGynecol India.* 2011; **61**: 641-4.