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Case Report

Transarterial embolization of acquired uterine artery pseudoaneurysm post cesarean section: A case report[☆]

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ABSTRACT

We present a case report of 31 31-year-old woman with refractory secondary postpartum hemorrhage after 44 days of cesarian section. Patient was in shock and found to have a ruptured Uterine artery pseudoaneurysm (UAP) in computed tomography angiography (CTA). Emergency trans-arterial Uterine artery embolization (UAE) was performed, aiding in the stabilization and recovery of the patient. The benefits of early recovery, minimal invasiveness, and the option of preserving fertility are offered by UAE compared to uterine artery ligation or hysterectomy.

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Introduction

Uterine artery pseudoaneurysm (UAP) is a rare complication of cesarean section [1]. It is an acquired vascular defect caused by a traumatic insult to the arterial wall of the uterine artery or its branches, typically secondary to iatrogenic surgical trauma [2]. Pooling of blood external to the arterial wall occurs, followed by hematoma formation which is localized

within a weak wall formed by the clotting cascade, forming a pseudoaneurysm [3].

This weak-walled outpouching communicates with the original artery across which there is turbulent blood flow, making it susceptible to rupture. The resultant hemorrhage may lead to hypovolemic shock and is therefore life-threatening. Timely diagnosis, preferably using CTA or duplex Doppler ultrasonography allows for appropriate management. Most cases of ruptured UAP call for endovascular embolization

Abbreviations: UAP, uterine artery pseudo-aneurysm; CTA, computed tomography angiography; TAE, transarterial embolization.

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as definitive management [4]. This report has been prepared according to the SCARE guidelines [5].

Case presentation

A 31-year woman P₂L₂, presented to the emergency department with a 7-day history of per-vaginal bleeding. Forty-four days prior, she had undergone an emergency cesarean section due to fetal distress. Immediately after the delivery, she suffered a postpartum hemorrhage which was managed conservatively with uterotonic agents and blood transfusion.

On admission, condom catheterization was placed to stop the bleeding, along with three pints of packed red blood cell transfusion for volume restoration. Post-transfusion hemoglobin was 10.6 g/dL. The patient's condition deteriorated further when her PV bleeding remained uncontrolled and she developed hypovolemic shock. Hence, she was promptly transferred to ICU after no improvement was observed despite both fluid resuscitation and inotrope support. Not long after admission, her vitals improved.

On further evaluation, CTA of abdomen and pelvis revealed a pseudoaneurysm measuring 18 × 10 mm in right lateral wall of the lower uterine segment arising from branch of right uterine artery (Fig. 1A and B).

Within a few hours, endovascular embolization of the UAP was performed. Left femoral arterial access was obtained and a 6 F guiding catheter (Neuron, Penumbra, Alameda, CA) was placed in the right common iliac artery. The right common iliac artery run showed pseudoaneurysm arising from a branch of the internal iliac artery. A microcatheter and micro guidewire assembly was navigated into the branch. A microcatheter run was taken and liquid embolization was performed with a mixture of 30% glue and lipoidal. The final check angiogram displayed complete obliteration of pseudoaneurysm (Fig. 1 C–F). There were no periprocedural complications noted.

With adequate inotrope support, hypovolemic shock resolved eventually. Her hemoglobin was 7.0 g/dL at the time of surgery, then increased to 8.8 g/dL with one-pint PRBC transfusion. Finally, a repeat USG abdomen and pelvis was performed after the intervention, which revealed a heterogenous area in the lower uterine segment without vascularity, status post embolization of uterine artery pseudoaneurysm.

As the patient remained hemodynamically stable, she was shifted to ward and was discharged from the hospital within a few days without any further complications.

Discussion

When an arterial injury dissects through all three layers (intima, media, adventitia) of the vessel wall, the accumulated blood forms a hematoma [6]. Fibrin-platelet cross-links then create a wall which contains the hematoma, forming an acquired pseudoaneurysm [3].

Moreover, unlike true aneurysms, pseudoaneurysms, otherwise known as false aneurysms, do not include any layer of

the arterial wall and are more prone to rupture due to their weak walls [2].

Exchange between the pseudoaneurysm and arterial lumen continues and the resultant turbulence of blood flow can be demonstrated by duplex Doppler ultrasonography as a “to-and-fro” or “yin and yang” waveform in the communicating channel. Turbulent blood flow combined with weak walls predispose pseudoaneurysms to perforation [6]. The fate of a pseudoaneurysm, however, is not limited to perforation. It can, for example, resolve spontaneously, thrombose, or embolize distally [2]. Resealing the UAP leads to a future vaginal hemorrhage following the initial resolution [7]. Patients may experience pelvic pain or remain asymptomatic [4].

Likewise, in the setting of pelvic surgery in females (as mentioned in this case), pseudoaneurysm occurs in the uterine artery and its rupture leads to extravasation of blood in the surrounding connective tissues, manifesting as vaginal hemorrhage [2]. The most common iatrogenic cause is cesarean section [8]. Additional gynecological and/or obstetric procedures that disrupt the integrity of the uterine arterial wall include dilation and curettage, myomectomy, hysterectomy, laparoscopic excision of endometriosis, uterine cervical conization among others. Based on reports, nontraumatic vaginal delivery, abortion, and deep-infiltrating endometriosis are non-surgical causes of UAP [7,9].

Diagnosis at the beginning of presentation can be quite difficult [7]. Thus, a differential diagnosis of UAP should be considered in patients with otherwise unexplained PV bleeding at any time during the postpartum period of up to 12 weeks following delivery. In addition, early confirmation of UAP via CT angiography prevents prolongation of definitive treatment.

Massive and/or recurrent PV bleeding, typically following a cesarean section, is the pathognomonic feature of ruptured UAP and should raise suspicion [10]. Vaginal hemorrhage may rapidly progress to hypovolemic shock, often needing inotrope support including blood transfusion. If left untreated, ruptured UAP may be fatal. Hence, immediate evaluation with CT angiography is a prerequisite to further management. Smaller arteries feeding the uterine artery can be identified using this method [6].

Subsequently, endovascular embolization is regarded as the definitive treatment of pseudoaneurysm, particularly for hemodynamically stable patients with ruptured UAP [7]. Uterine artery embolization (UAE) is initiated by fluoroscopy-guided catheterization to locate the uterine artery native to the pseudoaneurysm. Contrast is inserted to visualize the arterial branches supplying the lesion, following which solid/liquid particles are inserted into the catheter. These particles reach the contrast-filled arterial branches, where they deposit and block blood flow from the feeding artery, thereby preventing perfusion of the pseudoaneurysm and any further bleeding [11].

Not only is UAE advantageous in terms of its minimal invasiveness but also owing to the shorter duration of hospitalization that follows. Likewise, referring to a single reported case requiring additional contralateral embolization due to re-bleeding, bilateral UAE appears to be a safer option. On the other hand, bilateral UAE is not an option for those females who desire to preserve fertility. For such females,

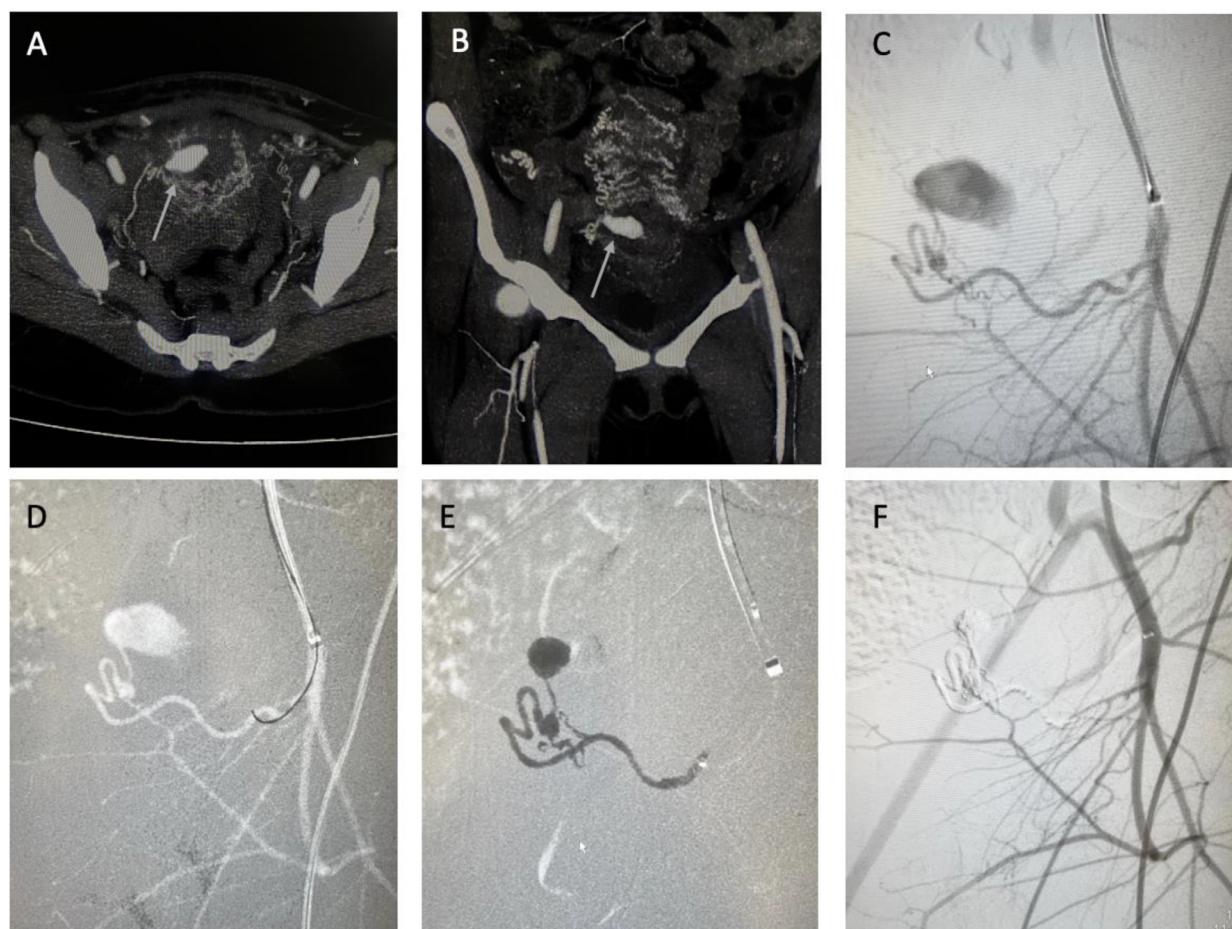


Fig. 1 – (A and B) CTA abdomen and pelvis axial and coronal images showing pseudoaneurysm (white arrow) in right lateral uterine wall (C) 2D right internal iliac angiogram showing uterine artery pseudoaneurysm (D) 2D roadmap showing navigation into the smaller branch. (E) Roadmap image showing microcatheter 30% glue cast (F) 2D right internal iliac artery angiogram showing complete obliteration of pseudoaneurysm with normal filling of other branches.

postselective UAE has not been reported to adversely affect future attempts at pregnancy [12].

When interventional radiology embolization of the uterine artery fails, then other arteries, namely: the ovarian artery, the inferior epigastric artery or middle acral artery, should be considered as alternate sources of bleeding.

Conclusion

The rare incidence of ruptured UAP as a postoperative complication in women is not sufficient to exclude it from differential diagnosis. Early diagnostic confirmation via CT angiography prevents delay in treatment and fatal outcomes. Though transarterial UAE is regarded as the first-line treatment, assessing the hemodynamic status of patients and their decision whether or not to retain fertility is a necessary step in selecting the appropriate treatment option for each female.

Patient consent

Patient consent form is present with the corresponding author and will be submitted to the editors, as requested.

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