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Case Report

Postpartum Hemorrhage due to a Uterine Artery Pseudoaneurysm

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Abstract

Postpartum hemorrhage is fatal because it can lead to maternal death by causing disseminated intravascular coagulopathy from massive bleeding. It can be caused by a variety of risk factors, but very rarely by a pseudoaneurysm. Herein, we describe a rare case of postpartum hemorrhage caused by a pseudoaneurysm of the uterine artery that was treated with arterial embolization. A 31-year-old woman underwent a cesarean delivery at 38 gestational weeks and experienced postpartum bleeding caused by a pseudoaneurysm. Massive bleeding caused disseminated intravascular coagulopathy, but it successfully stopped with immediate execution of arterial embolization. The patient was well treated with transfusion as well as antithrombin and fibrinogen injections. She was discharged 7 days after hospitalization. This unique case demonstrates that uterine artery pseudoaneurysms can cause postpartum hemorrhage and highlights the importance of rapid diagnosis, with embolization being a good treatment option.

Keywords: Uterine artery, Pseudoaneurysm, Postpartum hemorrhage, Embolization

Introduction

Arterial damage can result from a wide range of causes, including complications of pregnancy; pelvic surgeries, such as cesarean delivery; and trauma [1]. Uterine artery pseudoaneurysm refers to the continuous leakage of blood from the artery into the surrounding tissue caused by damage to the uterine artery, which forms a cavity. It may occur after a cesarean delivery and is one of the rarest causes of postpartum hemorrhage, and it is very fatal because it can cause disseminated intravascular coagulopathy (DIC) due to massive bleeding. Therefore, although it rarely causes postpartum bleeding, a uterine artery pseudoaneurysm should not be

overlooked and requires quick diagnosis as well as treatment.

Case Presentation

A 31-year-old (gravida 3, para 1, aborta 0) woman presented to the emergency room of our hospital at 38 weeks of gestation with a rupture of the membranes. Her relevant medical history includes an operation for vascular malformation of the right leg when she was 15 years old. As she gave birth via cesarean delivery to her first child 2 years before this pregnancy, a repeat cesarean delivery was decided upon and performed.

The patient had a blood loss of 1200 mL after giving birth to her male infant, who weighed 3050 g and had Apgar scores of 5 and 8. Before undergoing the cesarean delivery, she had no symptoms other than weak labor pain; however, during the surgery, a mass of large blood vessels assessed to be a pseudoaneurysm of approximately 5.0 x 6.0 x 8.0 cm in size was found in the left fundus of the uterus. The mass was soft and resembled a degenerated myoma. The bleeding during the surgery was not severe, but a Bakri intrauterine balloon was placed right after the surgery in the operating room to prevent postpartum and the patient was then transferred to the maternal-fetal intensive care unit.

Because massive vaginal bleeding was observed and blood was still oozing out of the wound on the patient's abdomen 2 hours after the surgery, blood transfusion was decided upon and an interventional radiologist was consulted. At that time, the patient's complete blood count revealed an elevated white blood cell count of 17.070 x 10^3/μL as well as mildly decreased hemoglobin and hematocrit concentrations of 10.1 g/dL and 29.9%, respectively. Her international normalized ratio was 1.96, activated partial thromboplastin time was 63.4 seconds, and platelet count was 139 x 10^9 L. In addition, her fibrinogen level was <60 mg/dL, antithrombin III level was 61%, fibrin degradation product level was 1.16, and D-dimer level was >20 μg/mL.

The patient was transferred to the angiography room 30 minutes later and underwent transfusion with 1 U of packed red blood cells. Catheterization was performed through the right femoral artery access site. Uterine atony was observed, and the top portion of the fundus was located at the L2 level. Both dilated tortuous uterine arteries ran along the lateral margin of the uterus. In addition, the pseudoaneurysm was located in the left fundus of the uterus. The left uterine artery feeding the huge pseudoaneurysm was revealed by contrast arteriography (Figure 1). Subsequently, embolization was performed on the two branches of the left uterine artery with histoacryl glue (glue/contrast medium = 1:3). However, vaginal bleeding and uncontrolled leakage continued after the first embolization, thus requiring additional procedures. Six vials of polyvinyl alcohol (355 – 500 μm) and four vials of gel foam (500 – 700 μm) were used for additional embolization on both uterine arteries. The vaginal bleeding immediately stopped after these supplementary procedures. Follow-up aortography detected extravasation appeared to be associated with the oozing of the wound at several points from both inferior epigastric arteries. Further embolization was conducted on these arteries using histoacryl, thereby completing the necessary procedures (Figure 2).

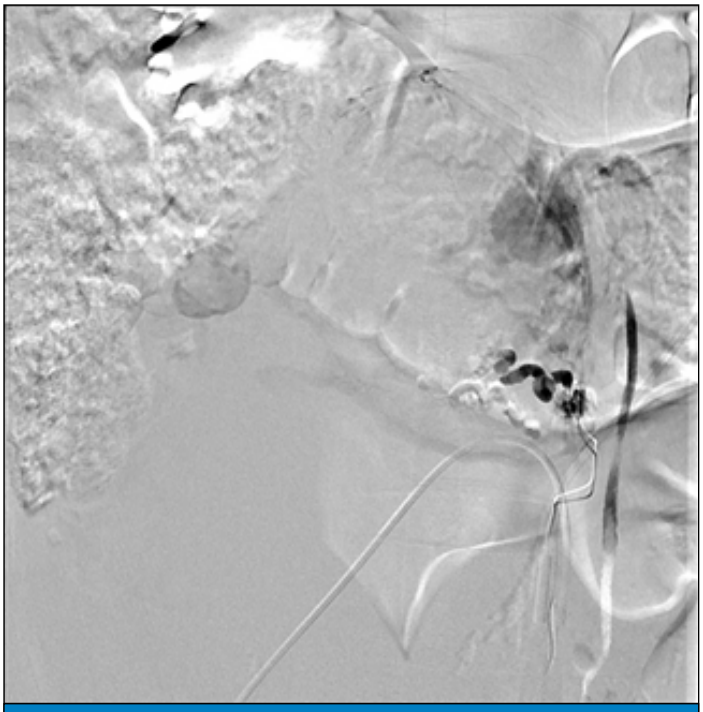

Figure 1: Left uterine arteriogram of the patient. The circle indicates the pseudoaneurysm fed by the left uterine artery.

The patient's follow-up complete blood count demonstrated an elevated white blood cell count of 14.290 x 10^3/μL as well as further decreased hemoglobin and hematocrit concentrations of 8.9 g/dL and 26.8%, respectively. Her international normalized ratio was 1.46, platelet count was 122 x 10^9/L, and activated partial thromboplastin time was 47.9 seconds. Her fibrinogen and antithrombin

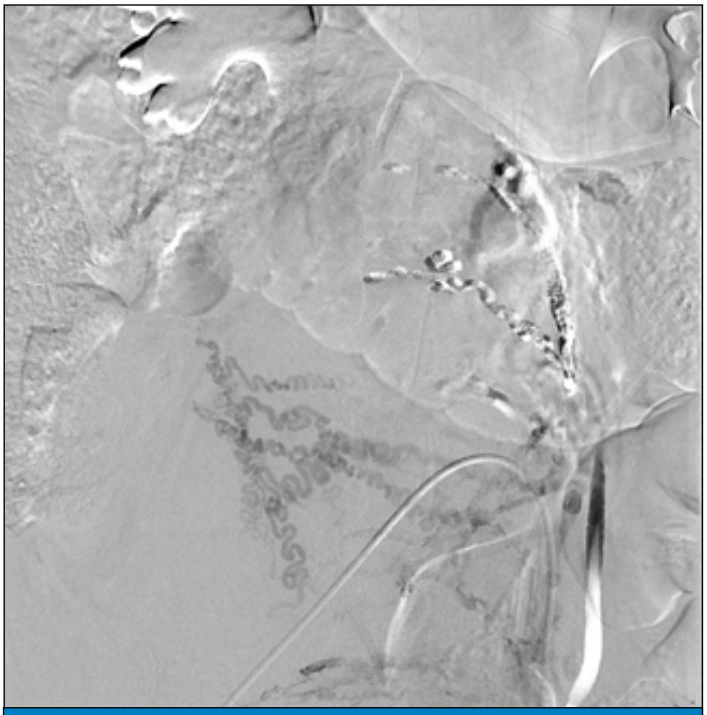

Figure 2: Postembolization angiogram of the patient showing no evidence of a pseudoaneurysm.

III levels were 103 mg/dL and 70%, respectively. The DIC improved with simultaneous injections of fibrinogen and antithrombin III while continuing blood transfusion therapy after the procedures. On the day of transfusion, the patient had received 6 U of packed red blood cells, 10 U of fresh frozen plasma, 3 g of fibrinogen, and 2500 U of antithrombin III.

The Bakri intrauterine balloon was removed from the intrauterine cavity 3 days after the embolization, and no additional bleeding occurred. The patient was discharged from the hospital 7 days after admission with a hemoglobin concentration of 11.2 g/dL. By the day of discharge, she had received 10 U of packed red blood cells and 11 U of fresh frozen plasma altogether. At her follow-up examination 2 weeks postpartum, ultrasonography was performed and did not reveal any abnormal signs associated with recurrence of the uterine artery pseudoaneurysm.

Discussion

A pseudoaneurysm is a very rare cause of postpartum hemorrhage. It is usually caused by an injury of the uterine artery from trauma or pelvic surgery, such as cesarean delivery [1]. It is commonly known to occur as a result of damage to the tunica intima of the blood vessels [2].

Uterine artery pseudoaneurysms also rarely occur during pregnancy; although their exact cause is unknown, their development has been attributed to changes in pressure in the arteries due to hormonal environments and anatomical factors in pregnancy [3]. Cases of ruptured pseudoaneurysms during pregnancy, causing vaginal bleeding and abdominal pain, have been reported, with embolization treatment allowing for a safe pregnancy and delivery at full term [2,4].

In addition, pseudoaneurysms can be caused by congenital malformations [3]. In the case described herein, the patient had a unique surgical history involving congenital vascular deformities in her leg. A definite connection between vascular malformations of the leg and pseudoaneurysms of the uterine artery is unknown, but innate vascular malformations should be considered a risk factor.

As in the case of our patient, pseudoaneurysms could be asymptomatic and detected by chance during surgery. However, similar to the above-described cases, a pseudoaneurysm with rupture could also induce such symptoms as severe vaginal bleeding and abdominal pain [4]. It could lead to death in the worst-case scenario.

A pseudoaneurysm can be diagnosed by computed tomography or angiography, but it can be more safely diagnosed by ultrasound in pregnancy. Magnetic resonance imaging is a viable option for pseudoaneurysms measuring <10 mm, which can be difficult to distinguish by ultrasound [4].

Sufficient fluid supply and blood transfusion are important when treating patients with vaginal bleeding due to uterine artery rupture. In addition, proper administration of fibrinogen and antithrombin injections to prevent DIC is also imperative.

In the past, it was only possible to treat rupture of uterine arteries through laparotomy, but as procedural interventions developed over time, its treatment became much less invasive and faster in patients who maintain hemodynamically stable conditions [4].

Mortality does not differ between surgical and endovascular techniques, such as embolization; however, the latter approach has been associated with reduced treatment time, duration of hospitalization, and blood loss [3]. It also has the advantage of preserving fertility compared with hysterectomy.

In conclusion, a uterine artery pseudoaneurysm should be considered as a cause of postpartum bleeding. It is a rare but fatal condition. Patients' the supply of fluids and transfusions against massive bleeding are important, and rapid diagnosis through computed tomography or angiography is required. Ultrasound and magnetic resonance imaging are useful diagnostic tests for pregnant women. Our case suggests that uterine artery embolization can be the first treatment of choice for hemodynamically stable patients.

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