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Postpartum hemorrhage as a result of acquired uterine arteriovenous fistula post-vaginal delivery

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Uterine arteriovenous fistulas (UAVF) occur more frequently and generally result from trauma, such as curettage or pelvic surgery. UAVF is life-threatening, as patients can suffer from profuse bleeding. Most reported cases are acquired as a secondary outcome to cesarean delivery but rarely as a result of vaginal delivery.

A 24-year-old woman gave birth to a healthy 3.11 kg full-term baby via spontaneous vaginal delivery at our obstetrics inpatient department. Her prenatal course had been uneventful, without underlying coagulation defects, medical diseases, or drug exposures. She only had a previous history of spontaneous abortion treated with dilation and evacuation. The ultrasonography revealed that the placenta was lodged in the anterior wall of the uterus, about 31 mm thick, grade III maturity (Fig. 1A). Eventually, the entire placenta ejected itself nine minutes after the baby was delivered without complications and manual exploration. Through visual estimation, she lost about 400 mL of blood during delivery and the post-delivery procedure. However, the patient returned on postpartum day 12 and complained of a hemorrhage gushing rapidly from the uterus. Two massive vaginal bleedings had occurred three days before her admission and resulted in a total blood loss of about 500 mL. Hemorrhaging aside, the patient reported no abdominal pain or anything else. She was hemodynamically stable when she arrived and denied experiencing abdominal pain and dizziness. We noted disseminated intravenous coagulopathy, as laboratory data showed severe anaemia (hemoglobin: 6.5 g/dL). As a result, the patient was supplemented aggressively with intravenous fluids and massive blood components.

Subsequently, she underwent conventional ultrasonography, which revealed that the non-echo structure of the uterus' anterior wall close to the endometrium was 2.99 × 1.67 cm and had ill-defined edges (Fig. 1B). Color Doppler flow imaging exposed a distorted and expanded blood flow signal: dilated, tortuous vessels were visible on the anterior and left sides of the uterus. Pulsed wave ultrasound showed a turbulent spectrum and venous blood flow at the peak of the systole. Uterine and pelvic blood flow exhibited high velocity (78.5 cm/s) and low resistance (0.29) (Fig. 1C). Our patient, who was hemodynamically stable during the first week in the hospital, was administered oral ferrous sulfate. Her platelet count and coagulation profile were normal. Yet the patient reported sudden "gushes" of bright red blood in her vagina on postpartum day 22. The visual estimated

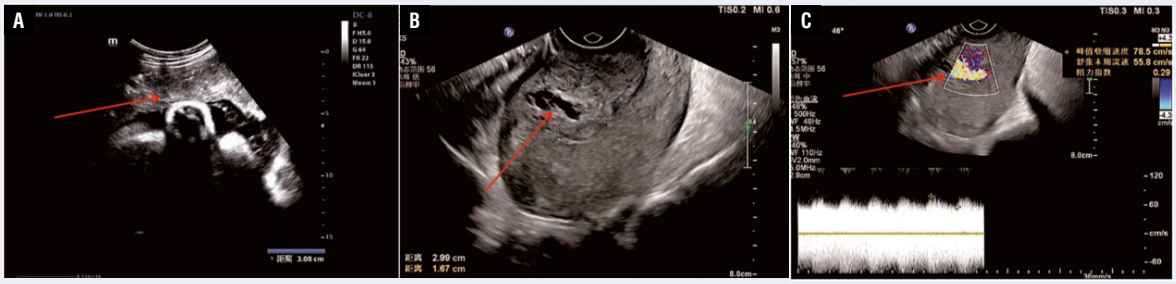

Figure 1A. B-ultrasonography revealed the placenta lodged of the uterus (red arrow); **B.** Transvaginal sonography image of the uterus a low-echoic cystic lesions (red arrow); **C.** Color-flow Doppler revealed a mosaic pattern of blood flow (red arrow)

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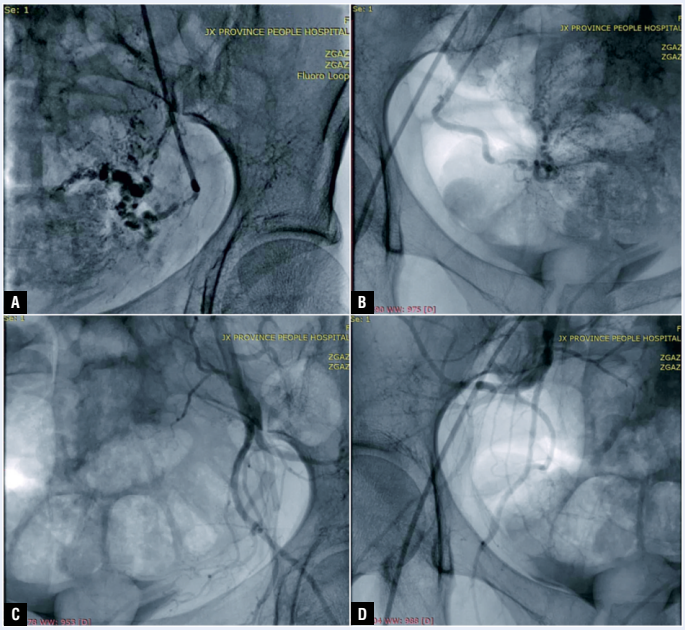

Figure 2. The dilated uterine artery and tortuous arteriovenous net seen during the UAE (uterine artery embolization). Angiography before embolization of the left **(A)** and right **(B)** uterine arteries. Angiography after embolization of the left **(C)** and right **(D)** uterine arteries

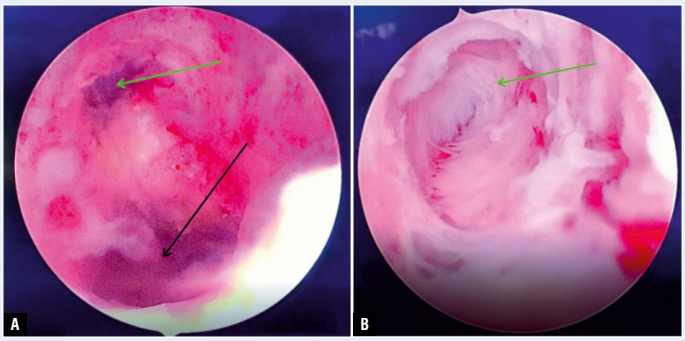

Figure 3. Hysteroscopic image of a false cavity in the uterus. The green arrows point prominent a false cavity in the uterus

blood loss was 400 mL. The vaginal bleeding gradually ceased eventually. However, she suffered from an abrupt and profuse vaginal hemorrhage in the uterine cavity again two days later. Her estimated blood loss this time was 800 mL, and her hemoglobin levels dropped from 10.9 to 6.0 g/dl. She was hemodynamically unstable, and a physical examination showed she was drowsy and hypotensive (88/56 mmHg), with signs of cyanosis in her extremities. She denied abdominal pain but reported dizziness. Laboratory data revealed severe anemia (hemoglobin: 6.5 g/dL) and abnormal coagulation tests. The patient continued to be given oxytocin and prostaglandin to control hemorrhage in postpartum uterine atony, but she failed to respond to treatment.

Her family requested that a uterine-preserving procedure be conducted if possible. Hence, Pelvic Digital subtraction arteriography was promptly performed, disproving the earlier suspicion of a typical UAVF lesion over the left uterine artery. The arterial phase during arteriography showed dilatation of uterine arteries to accommodate high-volume shunting through the uterus. Uterine artery embolization of the bilateral uterine arteries was immediately carried out with microspheres for embolization (Fig. 2).

The woman's follow-up ultrasound images were reviewed and displayed intrauterine residue. However, on hysteroscopic inspection of the uterine cavity, a false cavity in the uterus was discovered in the anterior wall of the uterus (Fig. 3). The anterior wall of the false cavity was situated above the normal intrauterine entrance (Fig. 3A). Observed was a long and narrow lacuna, surrounded by musculo-fibrous tissues, no intimal tissue covering the walls, and no fallopian tube opening (Fig. 3B).

The importance of combinedly reviewing blood loss estimate and laboratory data post birth requires more attention. Timely spectral ultrasonography of the uterus should be considered necessary post-delivery.

Article information and declarations

Conflict of interest

All authors declare no conflict of interest.