



# Retained Placenta Increta After Uterine Artery Embolization Following Vaginal Delivery: Report of Two Cases

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## Abstract

**Introduction:** Placenta increta is a major obstetric complication that can lead to life-threatening postpartum hemorrhage (PPH), particularly when it is undiagnosed during vaginal delivery.

**Case Report:** This report presents two cases of vaginally delivered pregnancies complicated by placenta increta, both treated with uterine artery embolization (UAE) followed by placental extraction at different time intervals. In both cases, UAE proved highly effective in controlling acute and severe vaginal bleeding. In case 1, immediate placental extraction was attempted after UAE; however, uncontrolled vaginal bleeding recurred, necessitating a laparotomy for further placental extraction. This was followed by ligation of the bilateral uterine arteries and application of uterine body compression sutures. In case 2, manual placental extraction was performed 48 hours after UAE, when ultrasound Doppler indicated adequate uterine contraction and minimal placental blood flow. The placenta was successfully extracted intact with minimal bleeding.

**Conclusions:** Delayed placental extraction following UAE may reduce the risk of recurrent massive vaginal bleeding in vaginal deliveries complicated by placenta accreta spectrum (PAS).

**Keywords:** Unsuspected placenta increta, Postpartum haemorrhage, Uterine artery embolization, Ultrasound Doppler, Vaginal delivery

## Case Presentation

### Case 1

A 36-year-old G3P1 woman at 35+6 weeks of gestation was admitted for preterm premature rupture of membranes (PPROM). The patient had a history of five prior hysteroscopic surgeries for intrauterine adhesions and had been informed of the increased risk of placenta increta. Labor started shortly after admission, resulting in vaginal delivery of a live newborn. However, the placenta was not expelled spontaneously. Routine attempts at manual extraction were unsuccessful, and vaginal bleeding increased to 1300 mL. Uterine artery embolization (UAE) was performed immediately, resulting in a significant decrease in bleeding. However, uncontrolled vaginal bleeding recurred after a second attempt to remove the placenta, with total blood loss reaching 2200 mL. Ultimately, a laparotomy was performed, followed by ligation of the bilateral uterine arteries and application of uterine body compression sutures. In total, six units of red blood cells and 400 mL of fresh frozen plasma were transfused.

### Case 2

A 35-year-old G2P1 woman at 33+0 weeks of gestation was admitted with PPRM. She had no known risk factors

for placenta increta. Labor commenced spontaneously, resulting in vaginal delivery of a live preterm infant. The placenta was not expelled spontaneously. Attempts at manual extraction were unsuccessful, and the placenta was left in situ. Five hours after delivery, vaginal bleeding increased to a total of 1100 mL. UAE was performed immediately, which significantly reduced the bleeding. Doppler ultrasound revealed a thin uterine wall with abundant blood flow (Figure 1). In contrast to case 1, a second attempt at placental removal was not made until 48 hours after UAE, when ultrasound Doppler showed a thickened uterine wall and minimal blood flow. The retained placental tissue was successfully removed intact through the vagina with minimal bleeding (Figure 2). A total of two units of red blood cells and 200 mL of fresh frozen plasma were transfused. The generalized stage of the two cases were described in Figure 3.

## Discussion

We present two cases of placenta increta treated with UAE followed by placental extraction at different time intervals. Immediate attempts at manual removal in case 1 resulted in recurrent massive bleeding; whereas in case 2, a 48-hour delay in manual placental extraction appeared to prevent further significant vaginal bleeding. These observations

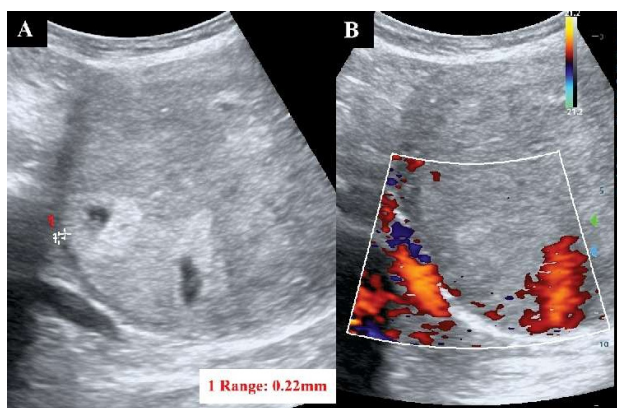
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**Figure 1.** Ultrasound image of thin uterine wall (A) and marked Doppler flow signals (B).

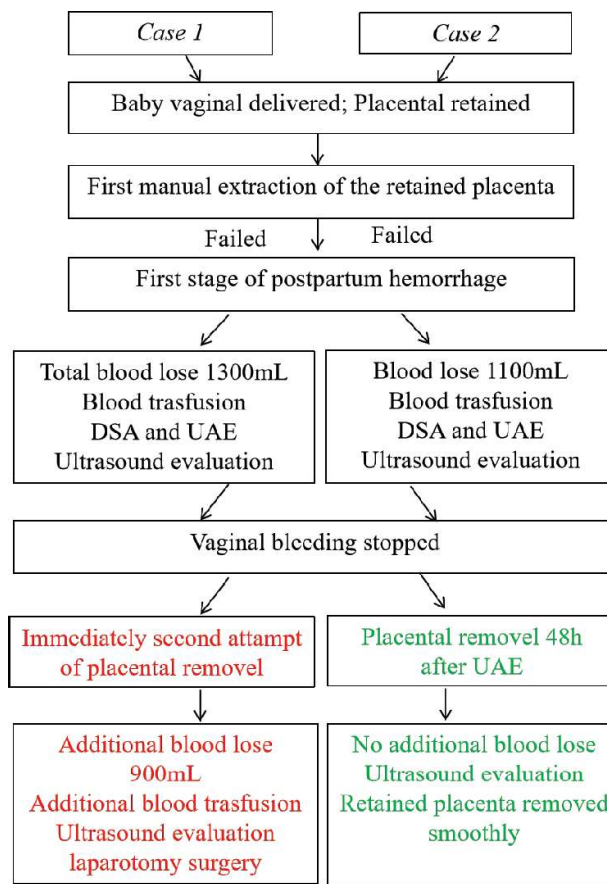


**Figure 2.** Ultrasound image of thickened uterine wall with rare blood signal (B) at the site of placental implantation.

suggest that delayed placental removal after UAE may help reduce the risk of recurrent bleeding (1). However, further studies are required to determine if a 48-hour delay might be optimal. Potential explanations include the progressive reduction in placental blood flow over time following UAE, allowing safer extraction with less bleeding.

Placenta increta is not a rare condition, with a prevalence ranging from 1 in 2500 to 1 in 500 pregnancies worldwide, and it is a significant contributor to maternal morbidity and mortality (2). Placenta accreta spectrum (PAS) is characterized by penetration of anchoring placental villi into the myometrium, resulting in placental retention and unexpected postpartum hemorrhage (PPH) (3,4). PAS disorders are classified as accreta, increta, or percreta according to the depth of invasion into the myometrium (5). Although placenta increta is generally considered less severe than placenta percreta, it accounts for approximately 15% of PAS cases and often leads to challenging placental extraction accompanied by unexpected PPH, particularly in vaginal deliveries (2).

UAE has emerged as an important intervention in the management of PPH associated with PAS due to its high success rate and minimally invasive nature (6,7). Although the role of UAE in reducing blood flow to the placenta is well established, the optimal timing of placental removal



**Figure 3.** Different treatment strategies and outcomes in the two cases.

after UAE remains unclear, with no consensus in the literature (8).

Neef et al (1) reported a case series of PAS patients who underwent cesarean section with the placenta left in situ, followed by UAE. Patients were scheduled for placental removal after a minimum of five weeks; however, this interval may be excessively long and may increase the risk of uterine infection. In our report, a 48-hour delay in placental extraction was associated with reduced bleeding, although further studies are required to determine whether this approach offers a better balance between preventing hemorrhage and reducing infection risk.

Although ultrasound and MRI demonstrate high sensitivity and specificity in identifying suspected PAS (9), the proportion of unsuspected PAS cases is not negligible. Zhao et al (10) reported that 35.4% of PAS cases were unsuspected, and the estimated blood loss within 24 hours was significantly higher in these pregnancies. Therefore, a protocol for managing unsuspected placenta increta should be established to mitigate blood loss in such cases.

In vaginal deliveries, the timing of retained placenta extraction is critical to avoid excessive bleeding and ensure safe removal. Case 2 illustrates a potentially feasible protocol for managing placenta increta that significantly reduces the risk of severe PPH. Ultrasound Doppler appears to be a promising tool for assessing placental blood supply and the associated risk of bleeding.

The presence of a thickened uterine wall may also indicate that the placenta is loosening and ready for extraction. Further studies should focus on developing evidence-based guidelines for the timing of placental removal in PAS cases.

Although delaying placental removal during cesarean section was reported with low risk of infection (11), the association of doing this after vaginal birth and infection lacks clinical evidence. In the present cases, there were no signs of infection or sepsis during the 48-hour interval, but this must be monitored closely. Further clinical studies should evaluate the risks of infection associated with delayed placental removal after vaginal delivery.

### Conclusions

In conclusion, the management of placenta increta following vaginal delivery can be improved by the use of UAE and ultrasound Doppler. Our case report supports the strategy of delayed removal of retained placenta increta in the context of PPH. However, further research, including larger studies and clinical trials, is needed to confirm the optimal timing and to evaluate potential risks such as infection.

### Authors' Contribution

**Conceptualization:** Xiaotian Ni, Ming Liu.

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**Writing—original draft:** James Chang.

**Writing—review & editing:** Xiaotian Ni.

### Conflict of Interests

Authors declare that they have no conflict of interests.

### Ethical Issues

Written informed consent was acquired from patients for the publication. The study was approved by the Ethics Committees of Shanghai East Hospital (Number: 2024-000).

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