

## Managing Placenta Accreta Spectrum with Prophylactic Uterine Artery Embolization: A Case Report

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### Abstract

*The Placenta accreta spectrum (PAS) encompasses several conditions including placenta accreta, increta, and percreta. These conditions are characterized by abnormal placental attachment and invasive growth into the uterine wall, often resulting from defects in the endometrial–myometrial interface and inadequate decidualization at sites of previous uterine scars. This case report highlights the importance of early and proactive intervention with vessel embolization in managing PAS. A 26-year-old female with a history of lower segment cesarean section (LSCS) was diagnosed with placenta accreta. A multidisciplinary approach was employed to manage her condition. The patient underwent an elective cesarean section combined with bilateral internal iliac artery embolization. The removal of an invasive placenta is associated with a high risk of massive blood loss during the peripartum period. Prophylactic intraoperative uterine artery embolization (UAE) significantly mitigated this risk by reducing blood loss associated with the removal of the invasive placenta. For patients with placenta accreta who wish to preserve their fertility, UAE is considered a safer and more effective option. The use of UAE as a preventive measure before or during delivery helps manage bleeding complications and supports better outcomes in the management of PAS.*

**Keywords:** *Placenta Accreta Spectrum, Placenta Increta, Placenta Percreta, Prophylactic Intra-Operative Embolisation.*

### Introduction

Abnormal placental implantation can be categorized based on the depth of invasion of the placental chorionic villi into the uterine wall. The primary classifications are placenta accreta, placenta increta, and placenta percreta. Placenta accreta is characterized by the partial or complete absence of the decidua basalis, leading to the direct adherence of the placenta to the myometrium [1]. Placenta increta involves deeper penetration of the chorionic villi into the myometrium. At the same time,

placenta percreta represents the most severe form, with the chorionic villi penetrating through the myometrium and possibly invading adjacent structures, such as the bladder or rectum [2, 3]. The placenta accreta spectrum (PAS) collectively describes these conditions of the morbidly adherent placenta, where abnormal placental adherence can lead to significant peripartum complications. PAS is increasingly recognized as a major obstetric concern due to its association with severe bleeding and complications during delivery [4].

The most common risk factors for developing an invasive placenta include placenta previa, where the placenta is abnormally positioned low in the uterus, and a history of lower segment cesarean section (LSCS). Previous cesarean deliveries created scar tissue that disrupts the normal decidualization process, increasing the likelihood of abnormal placental attachment. Additional risk factors include advanced maternal age, multiparity, and uterine anomalies. Women with any of these risk factors should undergo a careful evaluation to assess the risk of an invasive placenta. Doppler ultrasound is the primary diagnostic tool for investigating the occurrence of an invasive placenta due to its high sensitivity (100%) and accessibility. It is particularly effective in detecting abnormal placental implantation and assessing blood flow patterns that suggest invasion into the uterine wall. For more detailed imaging, particularly when there is suspicion of bladder invasion or when placenta previa is posterior, magnetic resonance imaging (MRI) can be employed. However, MRI is not routinely used as a preliminary screening tool due to its lower sensitivity compared to ultrasound (76.9% vs. 100%) and higher cost [5, 6].

Invasive placental conditions are associated with substantial risks during delivery. The estimated average blood loss (EBL) for women with placenta accreta is reported to be between 3000-5000 ml, highlighting the severity of this condition [7-9]. Managing these patients requires meticulous planning and intervention to minimize complications.

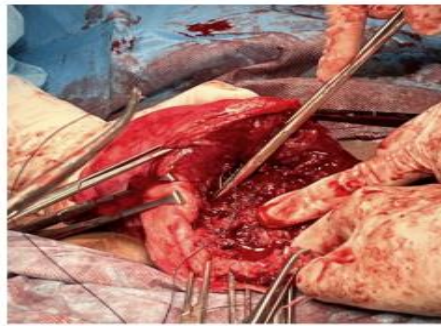
Prophylactic intraoperative uterine artery embolization (UAE) has emerged as an effective strategy to mitigate blood loss and

preserve fertility in women with invasive placentas. UAE includes uterine arteries to reduce blood flow to the placenta, thereby decreasing the risk of severe hemorrhage during the removal of the invasive placenta. This approach has been shown to be both safer and more effective in managing the risks associated with PAS while offering a fertility-preserving option [2].

## **Case Description**

A 26-year-old female, gravida 2, para 1, live 1, at 36 weeks and 4 days of gestation, with a history of a previous Caesarean section, was admitted to Saveetha Medical College and Hospital for safe confinement. Her prenatal course had been uneventful with routine investigations returning normal results. The patient reported normal fetal movements and had no significant complaints. Upon examination, her vital signs were stable. Abdominal examination revealed a single live intrauterine fetus in a longitudinal lie with cephalic presentation. The suprapubic transverse scar from the previous Caesarean section appeared healthy.

An MRI was performed, which demonstrated that the placenta was predominantly posterior with a margin completely covering the OS. The imaging also showed dark intraplacental bands and disruption of the hypointense myometrial interface by the placenta, with tenting of the base of the bladder wall. These findings were consistent with placenta percreta. After consulting with an interventional radiologist and a urologist, the decision was made to proceed with an elective lower segment Caesarean section (LSCS) and bilateral anterior division internal iliac artery embolization.



**Figure 1.** Uterine Artery Embolization

Before the procedure, a catheter was placed (see Figure 1). During the LSCS, the placenta percreta, measuring 8 x 5 cm and lacking identifiable myometrium in the lower segment, was observed. Following the delivery of the baby, internal iliac artery embolization with foam gel was performed. The patient experienced significant blood loss (2.5 liters), which was managed with 5 units of packed red

blood cells, 2 units of fresh frozen plasma, and 2 units of platelets. The newborn was a full-term male weighing 2.5 kg, with Apgar scores of 8/10 and 9/10. A multidisciplinary approach was employed throughout the procedure. The postoperative period was stable, with the patient's vital remaining within normal limits. The uterus was well-contracted, and there was no excessive vaginal bleeding.



**Figure 2.** LSCS with Embolisation

## Discussion

Placenta accreta is a serious obstetric condition with an incidence of approximately 1 in 2,500 births and 1 in 2,000 deliveries [10, 11]. This condition is characterized by abnormal attachment of the placenta to the uterine wall, often involving deeper invasion into the myometrium. The main risk factors associated with placenta accreta include advanced maternal age (over 35 years),

multiparity, placenta previa, and a history of Caesarean sections or uterine trauma. These factors contribute to abnormal placentation and increase the likelihood of invasive placental disorders. Abdoulaye et al. found that most patients with placenta accreta had at least one of these risk factors, which underscores the importance of careful assessment and management of women presenting with these predisposing conditions [12]. Additionally,

there is an established association between placenta previa and uterine scarring, which increases the likelihood of placenta accreta [13]. Abdoulaye et al. also reported that among 17 cases of placenta accreta, 11 were associated with placenta previa [12]. The morbidity and mortality associated with placenta accreta highlight the critical need for early prenatal diagnosis [14]. Twickler et al. noted that a myometrial thickness of  $\leq 1$  mm on ultrasound, which indicates the presence of large vascular lakes, is a strong predictor of myometrial invasion [15].

Ultrasound is a key diagnostic tool for assessing the likelihood of placenta accreta. Twickler et al. identified that a myometrial thickness of  $\leq 1$  mm on ultrasound, indicative of large vascular lakes, is a strong predictor of myometrial invasion. This finding can guide clinical decision-making and planning for delivery [15]. Additionally, magnetic resonance imaging (MRI) provides complementary information, particularly in cases of placenta percreta, where the placenta extends into adjacent structures such as the urinary bladder. MRI can offer a more detailed assessment of the extent of invasion, which is essential for planning surgical interventions [15]. In this case, prophylactic embolization of the internal iliac arteries was performed before placental delivery. This procedure significantly reduced intraoperative blood loss, demonstrating the effectiveness of prophylactic intraoperative UAE in managing invasive placental conditions. UAE helps to minimize hemorrhage by reducing blood flow to the placenta and is a critical intervention in cases where significant placental invasion is anticipated. However, concerns about fetal radiation exposure associated with the UAE have been raised. The International Commission on Radiological Protection suggests that fetal radiation exposure exceeding 150 milliGrays can be harmful. Therefore, balancing the benefits of UAE with potential

risks to the fetus is important, and efforts should be made to minimize radiation exposure whenever possible.

The treatment options for invasive placentation are different and include removal of the invasive placenta without hysterectomy, conservative treatment, and leaving the placenta *in situ* [2]. Hysterectomy is often effective in reducing maternal complications associated with invasive placentation but comes with the significant disadvantage of infertility. On the other hand, conservative management, which involves leaving the placenta in situ, aims to preserve fertility but carries risks such as infection, postpartum hemorrhage, delayed hysterectomy, and in severe cases, maternal mortality [4, 5]. Removal of the invasive placenta without hysterectomy can potentially avoid some of these complications but often results in substantial peripartum blood loss. To address this issue, prophylactic UAE has emerged as a preferred strategy. By reducing blood loss and minimizing the need for hysterectomy, UAE offers a balance between managing hemorrhage and preserving reproductive function. This approach aligns with current best practices for handling complex cases of placenta accreta and percreta, providing a more favorable outcome for both the mother and the baby.

## Complications

In the current case, major complications associated with UAE were not reported, which is generally consistent with the relative rarity of such serious issues in these procedures. While UAE is a minimally invasive treatment with a relatively favorable safety profile, there are potential complications that, though uncommon, may occur. Post-procedure infections are one potential complication, though they are infrequent. These infections can manifest as pelvic infections or abscesses and may require antibiotic treatment to manage effectively. In addition, fever, transient foot,

iliac thrombosis, and uterine necrosis are also other complications that can occur after UAE. Monitoring and appropriate management are key to minimizing and addressing these potential issues.

## Delivery

A gestational age window of 35 0/7 to 36 6/7 weeks is recommended for scheduling a cesarean delivery when planning the procedure. This timing is preferred to balance the benefits of early delivery with minimizing risks associated with preterm birth. However, earlier pre-term delivery may become necessary under certain circumstances including continuous bleeding, pre-eclampsia, labor, rupture of the amniotic membranes, fetal impairment, or the emergence of maternal comorbidities.

## Conclusion

In cases of placenta accreta, prophylactic UAE has been demonstrated to drastically reduce blood loss and the necessity for hysterectomy. This approach is valuable for pregnant women who want to maintain their fertility. By strategically occluding uterine arteries, UAE effectively minimizes the risk of excessive hemorrhage, which is a common and severe complication associated with placenta

accreta. Moreover, this preventive measure is associated with a reduction in maternal morbidity, including severe bleeding and the subsequent need for surgical interventions like hysterectomy. The effectiveness of prophylactic UAE in reducing these risks makes it a preferred treatment modality for managing placenta accreta, especially in cases where preserving the uterus and future fertility is a priority. Overall, UAE represents a safer and more effective strategy for preventing maternal complications related to placenta accreta. It allows for better management of blood loss, helps avoid major surgical interventions, and supports the preservation of reproductive health. This method reduces the chance of serious delivery-related problems while optimizing mother and fetal outcomes.

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## Conflict of Interest

The authors hereby declare that there is no conflict of interest in this study.

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