

Case Report

A case report and literature review of spontaneous uterine rupture in mid-pregnancy caused by placenta percreta

Dan Xu, Jia Liu, Yuting Peng (✉)

*Department of Obstetrics, Yueyang People's Hospital, Yueyang 414000, China***Received:** 25 September 2024 | **Revised:** 15 October 2024 | **Accepted:** 18 October 2024

ABSTRACT

Placenta percreta is a rare obstetric complication that can easily lead to uterine rupture and massive hemorrhage, threatening the lives of both mothers and fetuses. The occurrence of placenta accreta is associated with advanced maternal age, a history of previous uterine surgery, multiple intrauterine procedures, abnormal placental attachment sites, and uterine anomalies. Its clinical manifestations lack specificity, making it prone to misdiagnosis. For pregnant women with high-risk factors for placenta accreta, early diagnosis during pregnancy is crucial. For those diagnosed with placenta accreta, close monitoring during pregnancy is necessary to guard against the occurrence of uterine rupture. This article reports a case of placenta percreta with spontaneous uterine rupture in the second trimester treated at Yueyang People's Hospital; discusses its etiology, diagnosis, and treatment; and provides a reference for clinical diagnosis and treatment.

KEYWORDS

placenta percreta, second trimester, uterine rupture

1 Introduction

Uterine rupture refers to rupture of the uterine corpus or lower segment during pregnancy or childbirth. Although rare, it can lead to emergency hysterectomy or severe maternal and fetal complications and is therefore considered a critical condition that requires high vigilance and attention from clinicians. With the implementation of the three-child policy in China, the number of women with a history of cesarean section who become pregnant again has increased, leading to an increase in the number of uterine ruptures and further contributing to the occurrence of this serious complication [1–2]. Studies have shown that factors such as advanced maternal age [3], increased parity, scarred uterus, placenta accreta, trial of labor after cesarean section [4–6], excessive trial of labor due to cephalopelvic disproportion, induction of labor with oxytocin [7, 8], uterine anomalies, and multiple intrauterine procedures [9] may be associated with uterine rupture. Placenta accreta-induced uterine rupture is relatively rare, and the occurrence of placenta accreta is directly related to the increase in the number of cesarean sections [10]. Whether uterine rupture can be identified early and correctly while actively treating shock and performing surgery as soon as possible is the key to saving the mother's life and ensuring successful treatment. This article reports a

case of a pregnant woman with placenta percreta and spontaneous uterine rupture in the second trimester treated at Yueyang People's Hospital and discusses its etiology, diagnosis, and treatment to provide a reference for the identification and treatment of this type of disease in clinical practice.

2 Case report

The patient, a 37-year-old female, presented with a history of six pregnancies, two cesarean sections, and three abortions. She had undergone cesarean sections in 2010 and 2014, as well as three induced abortions. In 2021, she underwent hysteroscopic adhesion lysis. On October 30, 2023, she was admitted to the hospital with a chief complaint of “19 weeks and 2 days of amenorrhea and lower abdominal pain for 1+ hour.” Her last menstrual period was June 17, 2023, with an expected date of confinement of March 24, 2024. An ultrasound examination at an external hospital confirmed intrauterine early pregnancy at 50+ days of amenorrhea. On September 4, 2023, an ultrasound examination at an external hospital revealed that the placenta was attached to the anterior wall of the uterus, with a nuchal translucency (NT) of 1.0 mm. She was diagnosed with an intrauterine early pregnancy with a singleton fetus that was approximately 11+ weeks in size.

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✉ Address correspondence to Yuting Peng, 156775416@qq.com

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Later that afternoon, while washing her car, she experienced a bumpy ride and suddenly developed lower abdominal distension and pain in the car. The pain was continuous, followed by dizziness, fatigue, sweating, and vomiting of the gastric contents. There was no vaginal bleeding or leakage. She was then sent to our hospital by emergency 120. On physical examination, she had a pale appearance and sweated, $T: 36.7^{\circ}\text{C}$, $R: 18/\text{min}$, $P: 102/\text{min}$, $BP: 84/59\text{ mmHg}$. Her abdomen was distended, with a 13 cm long transverse surgical scar observed on the lower abdomen above the pubis. There was tenderness in the uterine area of the lower abdomen but no rebound tenderness. Bedside ultrasound revealed a singleton fetus in the uterus, mid-pregnancy, with free fluid in the abdominal cavity, mainly around the liver, with a maximum diameter of approximately 23 mm. Diagnostic abdominal paracentesis was performed, and 10 mL of noncoagulable blood was aspirated, suggesting intraperitoneal hemorrhage: suspected uterine rupture and hypovolemic shock. An emergency laparotomy was performed, and many dark red blood and blood clots were found in the abdominal cavity, with an estimated blood volume of approximately 4 500 mL and blood clots of approximately 1 000 mL. The lower uterine segment was obviously swollen, with prominent bridge vessels on the surface. A 3 cm long transverse rupture was observed on the left anterior wall of the lower uterine segment, with active bleeding and placental tissue at the rupture site (Fig. 1). The intraoperative diagnosis was placenta accreta with perforation and uterine rupture. Hysterotomy delivery, uterine repair, bilateral internal iliac artery ligation, and adhesion lysis of the intestines were performed. A stillborn fetus was delivered, and the operation was successful. The amount of intraoperative blood loss was approximately 2 200 mL. A total of 19 units of red blood cells, 27 units of cryoprecipitate, 1 650 mL of plasma, and 1 treatment unit of platelets were transfused during the operation. After the operation, the patient was transferred to the intensive care unit (ICU) for treatment. Another treatment unit of platelets was transfused, and the patient's condition stabilized before being transferred to the obstetric ward for further treatment. Postoperative pathology revealed villous invasion of the myometrium, which was consistent with placenta accrete (Fig. 2). After active anti-infection, uterine contraction promotion, anticoagulation, and symptomatic treatment, the patient was discharged on the 10th day after surgery.

3 Discussion

Placenta accreta spectrum disorders (PASs) are important causes of uterine rupture, severe postpartum hemorrhage, emergency hysterectomy, and maternal death during pregnancy. PAS can be classified according to the depth of invasion of trophoblastic villi into adherent placenta accreta, invasive placenta accreta, and placenta percreta. Sun et al. reported that in cases of uterine rupture before 24 weeks of gestation, 1/3 of cases were due to congenital uterine anomalies, 1/3 were due to abnormal placental implantation, and 1/3 had no identifiable risk factors [11]. The incidence of placenta percreta occurs at 0.03/1000 [12]. Nardi et al. reported a case of spontaneous uterine rupture in an unscarred uterus due to placenta percreta in an advanced age multiparous woman, who underwent total hysterectomy [13].

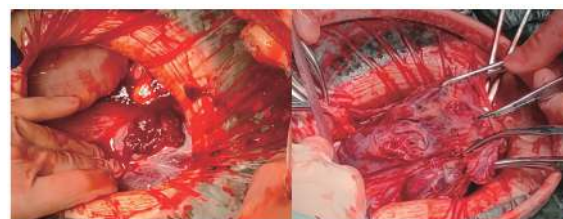


Figure 1 Uterine rupture caused by the placenta previa. Left image: The left side of the lower uterine segment anterior wall shows a ruptured opening with protruding placental tissue; right image: The anterior wall of the lower uterine segment shows prominent bridge vessels.

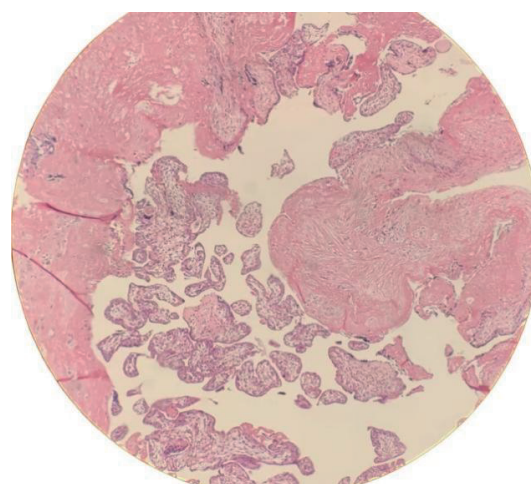


Figure 2 Pathological results. Microscopic examination revealed smooth muscle tissue and villous tissue accompanied by patchy necrosis, villous invasion of the myometrium, and local infiltration of many lymphocytes and neutrophils, which was consistent with changes in placenta accreta.

Boujida et al. reported a case of a 33-year-old patient [14], who was admitted to the emergency room for signs of shock at 29 weeks of a poorly supervised pregnancy, secondary to a spontaneous uterine rupture on a previously scarred uterus by a caesarean delivery two years prior to the events. She presented with massive haemoperitoneum with no vaginal bleeding. Foetus was in bradycardia. Placenta percreta with uterine rupture was confirmed. Quick total hysterectomy allowed favorable maternal and foetal outcome. This patient experienced uterine rupture caused by placenta previa. Breen et al. reported that the occurrence of placenta accreta is related to defects in the barrier function of the uterine decidua and excessive invasion of the placental cotyledons into the myometrium [15]. High-risk factors for placenta accreta include a history of cesarean section, placenta previa, previous uterine surgery (such as curettage, manual removal of the placenta, postpartum endometritis, hysteroscopy, endometrial ablation, uterine artery embolization, and myomectomy), uterine lesions or structural anomalies (such as intrauterine adhesions, a bicornuate uterus, and adenomyosis), *in vitro* fertilization-embryo transfer pregnancy, advanced maternal age, and twin pregnancy. The incidence of placenta accreta is significantly correlated with the number of cesarean sections and intrauterine procedures [16]. This patient had advanced maternal age, a history of two cesarean sections, four intrauterine procedures (including 3 induced abortions), and a history of hysteroscopic adhesion lysis, with multiple high-risk factors for placenta accreta.

Early diagnosis of placenta percreta is key to improving patient prognosis. Ultrasound is the first choice for diagnosing placenta accreta spectrum disorders. The ultrasound features of placenta accreta mainly include multiple hypoechoic areas of varying sizes in the placenta (placental lacunae), making the placenta appear like “Swiss cheese”; disappearance of the retroplacental space; thinning of the myometrium at the placental attachment site to less than 1 mm or disappearance of the myometrium; and irregular or interrupted strong echo lines between the uterus and bladder wall. Ultrasound can be used to assess various aspects of placenta accreta comprehensively, such as placenta location, depth, range, and involvement of surrounding organs, during pregnancy or before delivery. It can also predict the severity of placenta accreta by scoring [17]. However, normal ultrasound findings cannot completely rule out placenta accreta spectrum disorders. Ultrasound is limited in observing the posterior or lateral wall of the placenta and in obese pregnant women. In clinical practice, paying attention to high-risk clinical factors and further examination or exclusion of PAS by an experienced ultrasound physician with PAS diagnosis experience or magnetic resonance imaging (MRI) examination are necessary. Some researchers believe that elevated levels of alpha-fetoprotein or creatine kinase may indicate abnormal placental attachment or implantation [18]. This patient had multiple high-risk factors. No abnormality was found in the early pregnancy color ultrasound examination in other hospital, indicating that the placenta was attached to the anterior wall of the uterus, because it needs to be alert to whether there is cesarean scar pregnancy. She should be referred to a medical institution with the necessary conditions for further examination, diagnosis, or exclusion; close follow-up; and strict monitoring. In clinical practice, cesarean scar pregnancy is often diagnosed and terminated early.

The clinical manifestations of uterine rupture lack specificity and can manifest as abdominal pain, vaginal bleeding, peritoneal irritation, etc. Uterine rupture caused by placenta percreta may present with continuous abdominal pain and an abnormal fetal heart rate, which can be easily misdiagnosed as other acute abdomen conditions. Placenta percreta is characterized by villous penetration of the uterine wall to the serosal layer, with an incidence of 1/7000–1/2000 [19], but it rarely causes uterine rupture. Once uterine rupture occurs, shock symptoms and unexplained intraperitoneal hemorrhage should prompt immediate surgical exploration while vital signs are maintained.

Currently, the high-risk factors for placenta accreta are relatively clear; therefore, early prevention, early diagnosis, and strict prenatal examinations are extremely important. Effective family planning education, minimizing induced abortions, and avoiding uterine endometrial damage are crucial. Obstetricians need to strictly grasp the indications for cesarean section. High-risk pregnant women should be managed according to standard protocols, especially those with a history of cesarean section and multiple intrauterine procedures. They should undergo careful ultrasound or biomarker examinations, and MRI may be performed if necessary. Primary medical institutions can refer pregnant women with high-risk factors to upper-level hospitals with the

necessary conditions for prenatal examinations to detect placenta accreta in a timely manner and improve perinatal outcomes.

Conclusion

For pregnant women with high-risk factors for placenta accreta, early diagnosis during pregnancy is crucial. For those diagnosed with placenta accreta, close monitoring during pregnancy is necessary to guard against the occurrence of uterine rupture.

Author contributions

Dan Xu was responsible for the conception and overall design of the study, while Dan Xu and Jia Liu collaborated on conceptualization, data curation, and methodology, as well as contributed to the writing. Additionally, Dan Xu and Yuting Peng performed formal analysis and were involved in the review and editing process of the manuscript.

Ethics approval

The institutional review-board of the Yueyang People's Hospital approved this study.

Consent to participate

The volunteer was enrolled with written informed consent. The patient's authorized representative and the patient who had the ability to communication with the doctor agreed to participate in the study. The informed consent was obtained in written form.

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Conflict of interests

The authors declare no conflict of interest.

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