



## Preoperative Ultrasound Positioning Uterine Incision of Complete Placenta Previa to Reduce Maternal and Infant Complications in the Third Trimester

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### Abstract

**Introduction:** Pre-operative ultrasound assessment of placental margin position and severity of placental implantation, position of umbilical cord insertion, and guidance of uterine incision selection before operation based on anatomical markers on the body surface of pregnant women with complete placenta, thereby reducing severe blood loss during delivery and lowering postpartum hemorrhage.

**Case Presentation:** Pregnant woman, 27 years old, 37 weeks gestation, G5P1. Color Doppler tips: Complete type of placenta previa, placenta completely covers the anterior wall of the uterus and the inner cervix, part of the posterior wall and side wall. The placenta boundary with the muscle wall of the lower uterus is unclear at 32 mm below the umbilicus. The implantation area is 42 mm × 36 mm. MRI Results:

- Complete placenta previa.
- The boundary between the lower part of the anterior wall of the uterus is unclear, and placental implantation is possible.

**Conclusion:** For the complete placenta previa in the third trimester, the placenta is widely attached to the anterior wall of the uterus with partial implantation of the uterine incision. The placenta cannot be avoided to deliver the fetus. Ultrasound "three-line four-zone method" accurately locates the placental edge and the umbilical pedicle. Selecting an appropriate incision in the uterus can reduce bleeding during the operation and acute fetal blood loss, and the incidence of maternal and infant complications.

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### Introduction

Placenta previa is a serious complication during pregnancy, and its severity depends on the position and size of placenta, whether it is combined with placental implantation, implantation classification, the range and location of the implantation. When the placenta is implanted, if the villi invade the myometrium and reach or penetrate the uterine serosa, the placenta in the lower uterus and cervical can seriously affect the bladder and even the rectum, which significantly increases intraoperative bleeding and difficulty in surgery [1]. Placenta previa combined with placenta implantation can cause severe obstetric hemorrhage, peripheral organ damage, shock, DIC, increased neonatal asphyxia rate, anemia, infection and other complications. It is also one of the main reasons for obstetric perinatal removal of the uterus, a serious threat maternal life and reproductive health; improper handling can even lead to maternal death [2]. In order to avoid severe intraoperative bleeding, reduce maternal and infant complications, and preserve fertility, Scholars around the world have proposed a variety of surgical schemes, such as temporary blocking of the abdominal aortic balloon and double uterine incisions [3,4]. Abdominal aortic balloon occlusion is proven to be reliable and effective, but it may cause fetal asphyxia before delivery. The double incision design of the uterus is not suitable for the placenta to cover the anterior wall of the uterus widely [3,4]. Therefore, for a few special cases, this study combined ultrasound and nuclear magnetic resonance examination to accurately locate the placenta and the umbilical cord insertion end, and choose the appropriate uterine incision to reduce intraoperative bleeding, thereby ensuring the safety of mothers and infants.

## Case Presentation

Pregnant woman, 27 years old, 37 weeks' gestation, G5P1, A live baby was delivered by cesarean section 6 years ago and 3 abortions were induced. Weight: 65 Kg, height: 155 cm, no abnormalities were found on cardiopulmonary examination. Obstetric examination: Miyataka: 34 cm, abdominal circumference 100 cm, first outcrop, fetal heart rate: 145 bpm, without contractions, no vaginal bleeding. Color Doppler Tips: The placenta is located in the anterior wall of the uterus, and the lower edge of the placenta completely covers the inner cervix. The boundary between the placenta and the lower part of the anterior wall of the uterus is unclear, and placental implantation is possible.

The placenta implantation was evaluated based on the ultrasound scoring system and placental MRI results to predict the severity of placental implantation, and the uterus could be preserved [5-7]. Ultrasound "three-line and four-zone method" to scan the placenta position. Three-line definition: The midline of the clavicle on both sides and the midline of the abdomen; four-zone: Below the umbilical horizontal line, the midpoint of the umbilical line is divided into four areas from left to right. Specific evaluation method: The pregnant woman should fill the bladder properly (the volume of bladder urine is estimated by 200 ml ~ 300 ml with ultrasonic volume measurement), and take a 30-degree head-high lying position before the operation. The vertical probe was scanned from the upper left phase of the pregnant woman to the left midclavicular line, midline of abdomen, right midclavicular line, and upper right phase (the ultrasound image covers the left and right edges of the placenta). Two-dimensional and color Doppler dynamic images of the anterior wall and lateral placenta of the uterus were scanned and divided in sequence. The upper edge of the anterior wall placenta at the midline of the left and right clavicle and the midline of the abdomen reached the bottom of the palace, and the lower edge was completely covered inner cervix. A relatively thin area of the placenta is measured between the horizontal line of the umbilicus and the inner cervix. The upper edge is 23 mm below the horizontal line of the umbilicus, the lower edge is 36 mm above the horizontal line of the pubic bone, the left edge is 16 mm inside the left midclavicular line, and the right edge is 25 mm to the right side of the midline of the abdomen, the umbilical pedicle is located on the middle placenta in the right posterior wall (Figures 1-3).

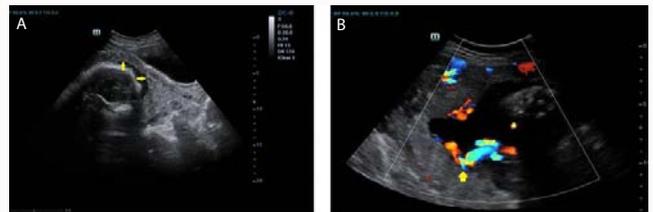
There was no abnormal blood vessel running on the fetal surface at this thin placenta area. Color Doppler showed that the blood flow signal was not abundant, so it was decided to choose a uterine incision there. During the operation, the lower parts of the anterior wall of the uterus were hypervascularity. Plasma tubes were placed under the fetal exposure to tighten the lower part of the uterus to temporarily block the ascending blood supply of the uterine artery. The uterine muscle layer was cut at the placenta where the ultrasound was thin and lack of blood supply, and the placenta was broken up for fetal delivery, cervical lift suture, posterior uterine wall suture, and "COOK balloon" uterine tamponade was performed. The intraoperative bleeding was only 800 ml. Discharged 3 days after surgery, the mother and child had a good outcome.

## Discussion

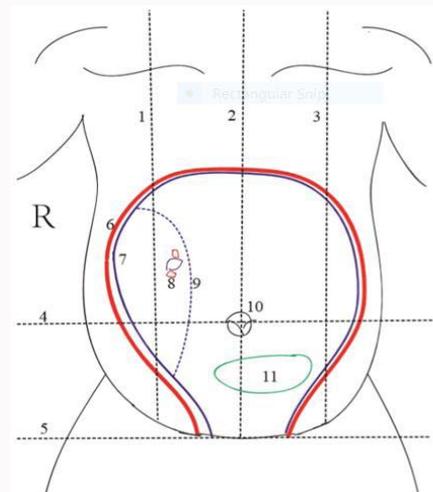
Complete placenta previa is often subject to adhesion and implantation due to the placenta and uterine wall and cervix, which can easily cause rapid bleeding during operation and even endanger the safety of maternal life. Anterior wall placenta cesarean section can



**Figure 1:** The placenta and myometrium are not clearly separated between the red arrows. Placenta implantation?



**Figure 2:** Thin Placenta (between two yellow arrows) Umbilical pedicle is located on the posterior wall (marked by yellow arrow), away from the incision.



**Figure 3:** Body surface marking line. (1: right midclavicular line 2: abdominal midline 3: left midclavicular line 4: umbilical horizontal line 5: pubic horizontal line 6: solid red line uterine boundary 7: solid blue line indicates anterior wall placental boundary 8: umbilical pedicle 9: The blue dotted line indicates the position of the posterior placenta 10: pregnant woman's umbilicus 11: thin placenta).

cause catastrophic bleeding if the placenta is taken directly. Therefore, the design of B-ultrasound and MRI uterine incision is especially important [8]. Before the operation, we accurately positioned the placenta (Figure 3) and the insertion end of the umbilical cord using the "three-line four-zone method" of ultrasound to design a uterine incision to avoid the placenta and umbilical pedicle as much as possible. In this case, the ultrasound showed that the placenta in the lower part of the anterior wall was not clear from the uterine wall. Suspected placental adhesion and implantation (mild). The placenta was evaluated based on an ultrasound and MRI scoring system that predicts the severity of placental implantation. Therefore, a thin

placental area in the lower part of the uterus was selected to open the uterus, which avoided the umbilical pedicle. The operation went well and the mother and child had a good outcome. Usually, imaging evaluation only indicates the severity of the implantation, and the choice of surgical method and path depends more on the experience of the operator. This method locates the placenta relatively thin through the patient's body anatomy mark, away from the umbilical pedicle, and guides the operator to choose the appropriate position of the uterine incision, which can significantly simplify the operation steps, reduce the operation time and the amount of bleeding during the operation, and not only ensure the safety of the mother and child but also reduces damage to the uterus.

## Conclusion

For cases of complete placenta previa with non-severe placenta implantation, those who cannot avoid placenta assessed by ultrasound preoperatively or who have reproductive requirements, use ultrasound "three-line four-zone method" to locate the placenta using common anatomical marks on the body surface of the abdomen, and choose to stay away umbilical pedicles without holes in the placenta can be punched in thin places, avoiding thick placental tissue, which can effectively reduce serious complications such as major bleeding during surgery and hysterectomy.

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