Vasa previa or not? A special parachute type of placenta caused dispute in ultrasonography diagnosis: A case report.

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shortened running title: Vasa previa or not? MRI for parachute placenta

Abstract

We present here a case of vasa previa with a special parachute placenta. During two times of ultrasonic scanning, there was dispute for the existence of vasa previa. Then the patient was referred to magnetic resonance imaging(MRI) scanning, and a parachute type of placenta and a previa vessel were identified. The patient subsequently underwent an elective cesarean section after 34 weeks of gestation, giving birth to a healthy child with an uneventful post-partum course. The cesarean section avoided laceration of the vasa previa which would probably bring fetal life threatening complication due to acute fetal blood loss. The identification and exclusion of vasa previa are essential to ensure appropriate and timely treatment. If there's contradictory ultrasonography results, MRI may offer some assistance in diagnosis.

Key words

vasa previa, parachute type of placenta, magnetic resonance imaging(MRI)

Introduction

Vasa previa is defined as placental vessels supported only by membranes, overlie the cervix, lie between the cervix and the presenting fetal part[1]. The prevalence of vasa previa is approximately 1 in 2500, but much higher among patients with low lying placenta, in vitro fertilization(IVF), or abnormal placental morphology,

such as bipartite or succenturiate lobe placentas in the lower uterine segment[2]. These previa vessels are vulnerable not only to compression, which may lead to fetal anoxia, but also to laceration, which can lead to acute fetal blood loss or exsanguination[3]. That results in poor pregnancy outcomes if not diagnosed prenatally[4].

Case

Our case was a 36-year-old Asian women, gravida 2 para 0. Before 32 weeks of gestation, the patient had gone to the local clinical institute as scheduled for prenatal examinations. Everything went smoothly during her process of pregnancy by then. At 33 weeks of gestation, the patient was found low lying placenta in that local institute by ultrasonography, and was referred to our hospital, a municipal tertiary institute.

An ultrasonography Specialty Register gave the transabdominal ultrasonic scan initially, and described as follows, "The placenta locates at the anterior wall of the uterine cavity, the distance between the placenta lower margin to the cervical internal os is 18mm. The insertion site of the umbilical cord is at the posterior wall of the uterine cavity, several vessels supported only by membranes insert into the placenta edges, including one vessel goes along the interior surface of the uterine fundus entering the placenta upper pole, and another vessel goes along the lower uterine segment entering the placenta lower pole near the cervix"(Figure.1 **a**). Though a little puzzled as the insertion site of the umbilical cord and the placenta location were at posterior and anterior walls respectively, the diagnosis was obviously vasa previa. According to the guidelines, we should accomplish the cesarean section at 34 to 35 weeks[5].

However, the patient insisted on obstetricians' reconsidering possibility of vaginal delivery since the vessel entering the placenta lower pole didn't go exactly over the cervical internal os. 3 days later, we offer second time of ultrasonic examination. This time, an ultrasonography Consultant gave both transabdominal scan and transvaginal gray scale with color Doppler, and described as follows, "Yes, the umbilical cord insertion is at posterior wall and the placenta locates at the anterior wall. But no obvious sign of vessel overlying the cervix". That result might overturn the previous diagnosis of vasa previa. So should we still schedule the cesarean section at 34 weeks of gestation?

In order to further understand the relationship between the patient's umbilical cord and placenta, we referred her to MRI scan. The radiologists didn't give any confirmation about umbilical vessels, because they're usually specialists focusing on diagnosis of placenta increta, since vasa previa identification is commonly in sonographers' field. But our obstetricians found a isolated vessel supported only by membrane going along the lower uterine segment and entering placenta lower pole near the cervix, just as the ultrasonography Specialty Register had described(Figure.1 **b** and **c**). The umbilical cord truly inserted at posterior wall of the uterine cavity, and Wharton's jelly lost from there with a great number of isolated vessels traveling through membranes connected to the anterior wall placenta(Figure.1 **c** and **d**).

At first, we considered there might be a very tiny placenta at the posterior wall and then connected by naked vessels to the much larger succenturiate lobe at the anterior wall. Immediately, an obstetric Specialty Register pointed out there was hardly any space for placental tissue existing between the amnion and the uterine muscle at posterior wall. Ultimately, we got the conception that it was a special "parachute" type of placenta, with no placental tissue at the posterior wall, just several isolated vessels diverging from umbilical posterior wall insertion site, like strings connecting to the parachute canopy, to the anterior wall placenta.

We performed a cesarean section at 34 weeks and 3 days of gestation. At the time of surgery, the incision at lower uterine segment was gradually and carefully deepened until the decidua reached. Then rapidly cut through the placenta that covered the lower anterior wall of the uterine cavity, and got the fetus out immediately. A healthy female fetus was delivered with Apgar scores 9,10 and birth weight 2450g. The placenta was sequentially checked to confirm diagnosis of vasa previa on the spot at delivery, and postoperatively by pathology gross examination(Figure.1**e**) before pathological sectioning. The postoperative course of the patient and the infant was uncomplicated and they were discharged 3 days later in a healthy condition.

Discussion

Vasa previa can be classified into two types. Type I vasa previa refers to velamentous insertion of the cord with resultant vasa previa, and Type II indicates interconnecting vessels between two lobes of placenta in a bipartite placenta or connecting vessel with a succenturiate lobe of the placenta[6]. The parachute placenta with vasa previa in our case was a little special. The previa vessel originated for the cord directly like the Type I. But that vessel doesn't carry the major umbilical blood flow, as it was only a small branch of the three main umbilical vessels(one umbilical vein and two umbilical arteries). In this aspect, it was more like Type II vasa previa. Our case could be considered as a transitional type between Type I and Type II.

The American College of Obstetricians and Gynecologists recommends the use of color Doppler in patients who are at a high risk for vasa previa[7]. The reasons we considered that the second time of ultrasonic examination hadn't detected the vasa previa may include the follows, but not limited to.

First, the most common sections for pelvic ultrasonography are standard horizontal, sagittal, coronal, and oblique sections originate from the standard ones[8]. However, from the MRI we know the previa vessel was from the patient's right posterior to left anterior. If the previa vessel long axis was not just in the ultrasound section, it would not form a curve image but merely a tiny cross section. In that circumstance, the color Doppler could only see a round red or blue signal in small diameter. And this patient's placental lower margin was also close to the cervical internal os, the previa vessel signal might disguise itself among the placenta blood flows.

Second, even if the transvaginal probe actually rotated and stayed at the previa vessel long axis direction of left-anterior to right-posterior, the ultrasonic definition of transvaginal gray scale might not be high enough to distinguish the vessel[9]. In that circumstance, the color Doppler could help. But color Doppler scanning should be turned on before the transvaginal probe rotation. Also the lower uterine segment hadn't formed well because of low lying placenta. Thus, the previa vessel was not just over the cervical internal os, but posterior to the relatively thick cervix in transvaginal scanning, bringing more difficulty to identify it.

Third, as mentioned above, our case was between Type I and Type II, and the previa vessel only carried a small portion of the umbilical blood flow. Thus, the blood flow in that previa vessel even might not be continuous but intermittent. Thereby, if there was just no obvious blood flow at the time gap during ultrasonic scanning, the vasa previa could still not be identified[10].

MRI can be an alternative in identifying vasa previa, if the ultrasound scanning results are contradictory[11]. MRI has some advantages in this field[12]. First of all, it is tomography[13]. So the image definition for spatial structures and soft tissues will be able to detect a really thin vessel. Second, the image can be reconstructed in three dimensions[14]. Therefore, any direction of the previa vessels' courses can be confirmed, not like the ultrasonography that needs the previa vessel's long axis within the certain scanning section to see the vessel curve. Meanwhile, the disadvantage of MRI in this field is unawareness of the blood flow direction, unlike the ultrasonography with color Doppler[15].

In conclusion, vasa previa results in poor pregnancy outcomes if not diagnosed prenatally. Ultrasonography, especially transvaginal scan with color Doppler is commonly used as diagnostic method. But if there's contradictory ultrasonography results, MRI may offer some assistance in diagnosis.

Disclosure of interests

None. All the authors have no conflict of interest.

Contribution to authorship

Wu Jiahan offered the prenatal care visits for the patient, analyzed the patient's MRI and ultrasonography results, and wrote the case report. Hong Ling, assisted in planning the treatment and the cesarean section, also took the pictures.

Details of patient's consent

The patient has submitted written informed consent for this case report publication.

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Details of ethics approval

This report is approved by the Ethics Committee of Ningbo Women and Children Hospital(approval number 2021No.28, Date 2021.05.25).

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