Clinical Case Report

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Placenta membranacea: an anormaly of the placenta

Three case reports

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Abstract

Rationale: The placenta membranacea (PM) is a rare type of placental abnormality, which is associated with placenta previa, antepartum hemorrhage (APH), postpartum hemorrhage (PPH), chorioamnionitis, fetal growth restriction (FGR), preterm birth even stillbirth. The purpose of this case report is to summarize the characteristics and analyze the relevant factors of PM.

Patients concerns: Repetitive B-ultrasound of the first patient demonstrated a thin placenta covering the most part of uterine wall, which completely covers the internal cervical ostium for 22 weeks. B-ultrasound of the second patient showed placenta partially covering the internal cervical ostium and fetus small for gestation age for 23 days. The third patient complained of abdominal pain and vaginal discharge for 1 day.

Diagnoses: Diagnosis of PM is based on Doppler ultrasound apparatus, and confirmed by pathology.

Interventions and Outcomes: In the first patient, elective cesarean section was performed. The second patient required termination of pregnancy due to poor postnatal outcome. The third patient underwent intrauterine fetal death. Of these 3 cases, one delivered a term fetus by cesarean section complicated with placenta previa and placenta accreta, one terminated the pregnancy because of serious fetal growth retardation, and the other underwent intrauterine fetal death.

Lessons: High-resolution color Doppler ultrasound apparatus can improve the diagnostic accuracy, and close antenatal surveillance followed by proper arrangement of delivery may improve neonatal outcomes.

Abbreviations: AC = abdominal circumference, AEDV = absence of end diastolic velocity, APH = antepartum hemorrhage, FGR = fetal growth restriction, MRI = Magnetic Resonance Imaging, PM = placenta membranacea, PPH = postpartum hemorrhage, PSV = peak systolic velocity, US = ultrasonography, WGA = weight for gestational age.

Keywords: chorionic villi, FGR, placenta disease, placenta membranacea, ultrasonic diagnosis

1. Introduction

Placenta membranacea (PM), also called placenta diffusa, is a rare type of placental abnormality. Its incidence in humans is estimated to be between 1 in 20,000 to 40,000 pregnancies.[1] Because of failure of villous atrophy in early gestation, functional villi cover the surface of gestational sac entirely or partially. Its characteristic of clinical manifestation is recurrent painless vaginal bleeding during pregnancy. It is also associated with antepartum hemorrhage (APH), postpartum hemorrhage (PPH), chorioamnionitis and placental retention. The outcome of fetus is usually poor due to growth restriction, preterm birth or stillbirth,[2] although half of the reported cases had live births.

We searched the clinical records of West China Second University Hospital, Sichuan University, from January 2010 to January 2018 for women with PM and found only 3 cases in total 79862 pregnancies. Informed written consent was obtained from the patients for publication of this case report and accompanying images, protection of personal information and confidentiality were prioritized. Ethical approval from the ethics committee of the West China Second University Hospital was obtained.

2. Case reports

2.1. Case 1

A 24-year-old woman, G5P0, had experienced 4 spontaneous abortions followed by curettage each time. An ultrasonography (US) imaging at 12 weeks of gestation revealed multiple cyst area beneath the chorionic plate. Repetitive US demonstrated a thin placenta covering the most part of uterine wall, completely covering the internal cervical ostium, with multiple cyst area beneath the placenta. Complete placenta previa and PM were suspected and the patient was scheduled for US evaluation of placenta and fetal growth in third trimester. At gestational age of

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29 weeks, this patient underwent Magnetic Resonance Imaging (MRI) test which confirmed placenta previa but excluded placenta increta. Fortunately, this patient had no vaginal bleeding ever throughout the pregnancy duration. She was hospitalized after gestational age of 37 weeks and meticulous plans were formulated, including the provision of dexamethasone for fetal lung maturity. Two days later, the patient underwent elective cesarean section and delivered a live-born baby, weighing 2810 g with Apgar scores of 10 and 10. Placental adherence was found during the operation and the placenta was successfully dissected by placental curettage. The placental disk measured $30 \times 20 \times 1.5$ cm and weighed 710 g (Fig. 1). No hemorrhage and infection was observed after operation. Microscopically, most of the chorionic layers of the membranes were absent, chorioamnionitis, placental invasion of the myometrium and placenta increta were observed. The patient was discharged 4 days after the operation in good condition.

2.2. Case 2

A 29-year-old woman, G5P0, had histories of two artificial abortions and two spontaneous abortions. She received regular prenatal care and routine US test. At gestational age of 24 weeks and 5 days, US image demonstrated a thin placenta covering the most part of uterine wall, partially covering the internal cervical os, with multiple cyst area beneath the placenta, and fetus small for gestation age. Three weeks later, repeated US test was performed and the situation got worse. The fetus was only equivalent to gestational age of 22 weeks and 6 days, with abdominal circumference (AC) < 10th percentile, as a result, fetal growth restriction (FGR) was diagnosed.[3] The thickness of placenta varied from 1 to 4.7 cm accompanied by extensive anechoic area and low-lying near the internal os. After seeking prenatal counseling on possibility of poor postnatal outcome, the mother required termination of pregnancy at gestational age of 28 weeks and one day. The placenta and dead fetus were vaginally delivered after induction of labor by rivanol. The weight of fetus was 677 g, and the weight for gestational age (WGA) was below the 10th percentile.[4] Owing to intrapartum retention of the placenta, uterine curettage was performed. The placenta measured $12 \times 10 \times 1.5$ cm, weighed 182 g (Fig. 2). Microscopic examination of placenta showed chorioamnionitis, placental calcification and focal infarction. The patient was discharged in good condition 2 days later.

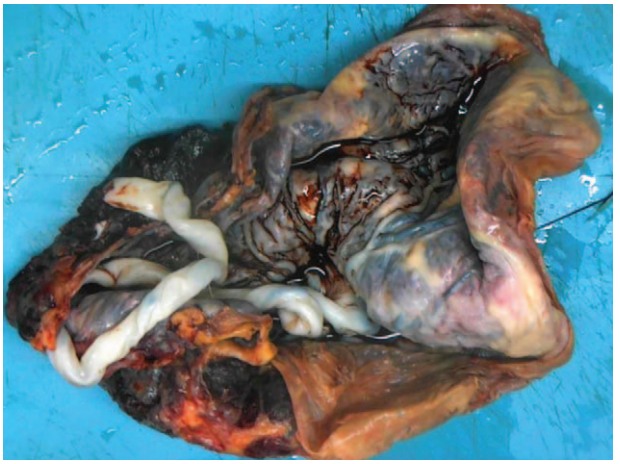

Figure 1. Placenta of case 1.

Figure 2. Placenta of case 2.

2.3. Case 3

A 20-year-old primigravida, had a history of painless, intermittent, vaginal bleeding during the first and second trimester. At 15 weeks of gestation, US imaging revealed anechoic area beneath the placenta, and the following US 2 weeks later revealed oligohydramnios and enlarged anechoic area. Prenatal US at 20 weeks of gestation revealed placenta covering two thirds of the uterine wall, lack of the echo of placental parenchyma, and PM was highly suspected. In addition, the fetus was only equivalent to 16 weeks and 5 days of gestation, and observed absence of end diastolic velocity (AEDV) of the umbilical artery, the peak systolic velocity (PSV) of the middle cerebral artery was 43.8 cm/s (between 1.29MoM and 1.50MoM).[5] At 25 weeks and 6 days of gestation, with the initial complaint of abdominal pain and

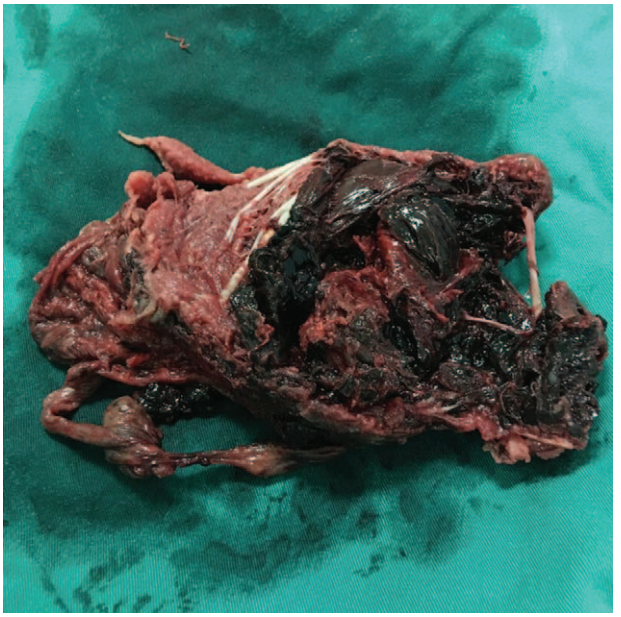

Figure 3. Placenta of case 3.

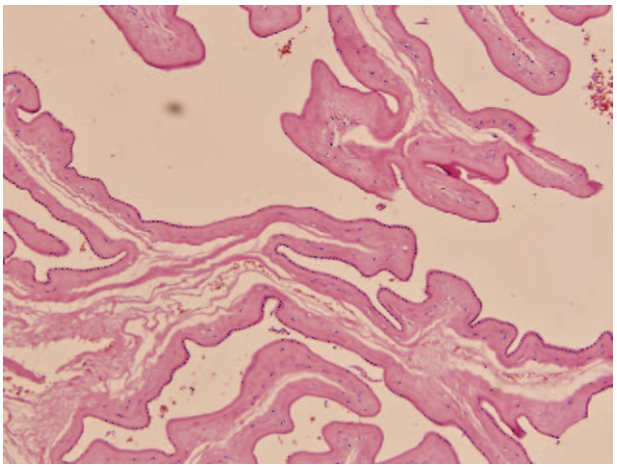

Figure 4. Histology of the placenta in case 3 showed the chorionic layers of the membranes were absent, amnionitis and infarction with hemorrhage (H&E, × 40).

vaginal discharge, the fluid was identified as amniotic fluid by pH test, and ultrasonogram revealed intrauterine fetal demise. After admission, the patient was induced labor with mifepristone and delivered a stillborn male fetus. The placental disk was measured $12 \times 10 \times 2$ cm and weighed 307 g, with blood clots on the maternal surface (Fig. 3). Histologically, the chorionic layers of the membranes were absent, amnionitis and infarction with hemorrhage were found on the placenta (Fig. 4). The patient was discharged on the second day of postpartum in satisfactory condition (Table 1).

3. Discussion

PM is a rare type of placental abnormality, its incidence in humans is estimated to be between 1 in 20,000 to 40,000 pregnancies,[1] we found three cases in total 79,862 deliveries, about 1 in 26,600 in our hospital during past eight years. During placental development, the primitive chorion layer differentiates into chorion laeve and chorion frondosum at 8 to 10 weeks. In PM, this differentiation does not occur and the chorionic villi retained beneath the membranes,[6] and fetal membranes are completely or partially covered by chorionic villi. The pathogenesis of PM is not clear. Many etiological factors have been suggested: previous endometritis, poorly developed blood supply in the decidua basalis or excessive blood supply to the decidua capsularis allowing for the persistence of villi on the chorion laeve, a failure in the dysgenesis of the trophoblasts resulting in the development of a primitive form of placenta, deep implantation of the ovum, and atrophy or hypoplasia of the endometrium.[7] In the three cases reported here, case 1 and case 2 both had a history of repetitive abortions and uterine surgeries, and the repeated endometrial trauma from uterine curettage may be the predisposing factor for their subsequent PM occurrence. The sac is covered by functional villi in early stage of pregnancy, therefore, the placenta covered the most part of uterine wall progressively, which increased the risk of placenta previa and resulted in painless recurrent vaginal bleeding starting in primary or secondary trimester. On the other hand, FGR, even intrauterine fetal demise often occurs because the absence of the villi leads to a decrease in fetoplacental circulation. Moreover, PM may be further complicated by PPH, abnormal placental adherence and placenta accreta.

In one previous review of PM,[7] the majority of patients presented in the second or early third trimester with painless recurrent vaginal bleeding. Most of the cases were diagnosed during postpartum examination of placenta, and there were only 2 out of 42 cases were antenatally diagnosed by US. However, in our 3 cases, PM were suspected in early second trimester even without vaginal bleeding, because these patients underwent regular prenatal care and routine US examinations. Therefore, diagnosis can be achieved by ultrasound, especially painless recurrent vaginal bleeding should raise the clinical suspicion of PM. In instances of second-trimester bleeding, when placenta previa exists, meticulous ultrasound examination should be performed to define the dimensions of the placenta.[8] High-resolution color Doppler ultrasound apparatus is the most useful and noninvasive method, which plays an important role in surveillance and management of high-risk pregnancies, reducing obstetric interventions and also the risk of perinatal deaths. There is no doubt that the advantages of obstetric ultrasound technique have led to improvements in pregnancy outcomes.[9] The sonographic appearances of PM were:

1. placenta covering most of the uterine wall;
2. lack of the echo of placental parenchyma;
3. often accompanied by FGR and oligohydramnios.

To our knowledge, MRI has no superiority in terms of diagnostic accuracy of PM, however, it may help the detection of the degree of placenta invasion. As a result, we recommend that sonographic evaluation of PM as the first-line method. Nevertheless, diagnosis by ultrasound is difficult and clinical manifestation of PM is diverse. The sonographers should have thorough understanding of the Doppler findings of PM. Proper and early diagnosis of PM can provide obstetricians with accurate information, and help them make proper arrangement of delivery, which may improve the neonatal outcome. Women with sonographic characteristics of PM in early stage of pregnancy should undergo follow-up ultrasound in the second and third trimester to raise attention of obstetricians of the potential presence of FGR even intrauterine fetal demise. Considering the etiological factors of PM, there may be a

Table 1

Cases of placenta membranacea in our hospital.

Case	Year	Gestational age at delivery	Placenta previa	FGR	APH	PPH	Delivery method	Placental adherence	Birth weight	Fetal outcome
1	2015	37^{+2}	+	–	–	–	Cesarean section	+	2810 g	term delivery
2	2016	28^{+1}	+	+	–	–	Vaginal	+	677 g	FGR
3	2018	25^{+6}	–	+	–	–	Vaginal	+	338 g	stillbirth

APH = antepartum hemorrhage, FGR = fetal growth restriction, PPH = postpartum hemorrhage.

potential risk of PM in the next pregnancy for the women with a history of PM. However, there is no any report now, which needs further observation.

Author contributions

Conceptualization: Li Zhang, Lin Wu.
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Supervision: Liangzhi Xu, Ying Hu.
Validation: Qiang Wei.
Visualization: Liangzhi Xu.
Writing – original draft: Lu Tang.
Writing – review & editing: Lin Wu.

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