Case Reports

Prenatal diagnosis of vasa previa through color Doppler and three-dimensional power Doppler ultrasonography. A case report

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Summary

Vasa previa occurs in pregnancy when one of the membrane vessels extends down to the level of the internal cervical os, ahead of the fetal presenting part and unsupported by the placenta tissue or umbilical cord. The rupture of the vessels might happen spontaneously or artificially and frequently results in fetal exsanguination and demise. Ultrasound prenatal diagnosis is highly important as it allows the identification of patients at risk, thus an elective cesarean can be performed before rupture the membranes. We report a case of vasa previa diagnosed through color Doppler mode in the 30th week of gestation, emphasizing the contribution of three-dimensional power Doppler to the adequate mapping of aberrant vessels, which greatly contributed to the success of the perinatal result.

Key words: Vasa previa; Prenatal ultrasonography; Color Doppler ultrasonography; Three-dimensional image.

Introduction

Vasa previa occurs when aberrant vessels extend down to the level of the internal cervical os ahead of the fetal presenting part and unsupported by the placenta tissue or umbilical cord. Rupture of the vessels, spontaneously or artificially, often results in fetal exsanguination and death [1]. Generally, vasa previa is caused by a velamentous insertion of the umbilical cord, but can also be due to abnormal morphology of the placenta (bilobed or succenturiate placenta) [2].

Prenatal diagnosis through ultrasound allows the planning of elective interruption of the gestation by cesarean section before rupture the membranes, with significant improvement in the neonatal diagnosis [3].

Three-dimensional ultrasonography (3DUS) in the multiplanar mode allows the evaluation of the spatial relationship between the aberrant vessel and the uterine cervix, which is not possible through two-dimensional ultrasonography (2DUS) [3, 4]. The 3DUS in power Doppler mode allows mapping of the vessels, which is highly important for the surgical section of the uterus [5].

We report a case of vasa previa diagnosed through 2DUS with color Doppler mode in the 30th week of gestation, and present the benefits of 3DUS in power Doppler mode for a successful perinatal result.

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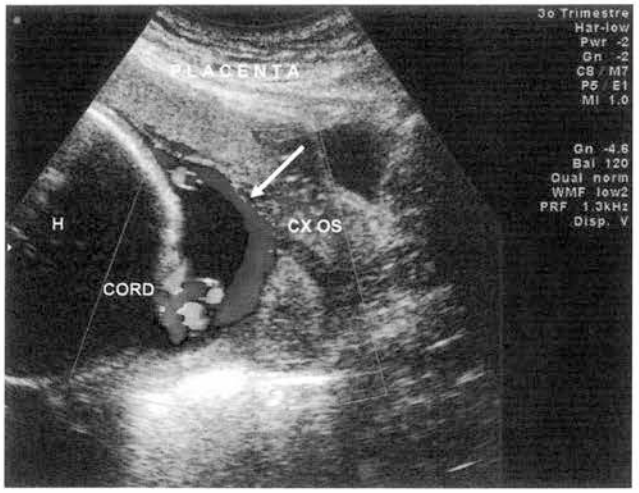
Case Report

A 26-year-old woman with a history of a spontaneous abortion three years before and a current gestation resulting from in vitro fertilization, presented at our service to have a morphological obstetrics ultrasound performed at the gestational age of 20 weeks. Transabdominal evaluation showed the placenta embedded in the lower segment of the uterus, with the inferior edge of the placenta covering the internal cervical os. Transvaginal complementation was performed and showed the low-lying placenta. Fetal morphologic evaluation did not show any anomalies, the volume of amniotic fluid was normal and estimated fetal weight adequate for gestational age.

Due to the diagnosis of a low-lying placenta the patient started being regularly assessed through ultrasound. In the 30th week of gestation a new transabdominal ultrasonographic evaluation was performed which showed the inferior edge of the placenta margining the internal cervical os, and velamentous insertion of the umbilical cord. Color Doppler showed the presence of aberrant vessels extending along the membranes between the fetal presenting part and the internal cervical os (Figure 1). Due to that finding, the hypothesis of vasa previa was considered; 3DUS in power Doppler mode allowed adequate mapping of the anomalous vessels (Figure 2).

The patient recovered without hemorrhage or other complications and a cesarean section was performed at the 36th week of gestation. During the incision in the lower segment of the uterus care was taken not to rupture any membranes that might tear the vessels and cause severe fetal exsanguination. The patient gave birth to a live female infant, weighing 2,750 g. Apgar scores at the 1st and 5th minutes were 8 and 9, respectively. The macroscopic exam of the placenta confirmed the diagnosis of vasa previa. The infant did not present any respiratory discomfort in the immediate postnatal period and the mother did not have any complications at surgery or in the immediate puerperium, and was released 48 hours later with the infant.

Fig. 1



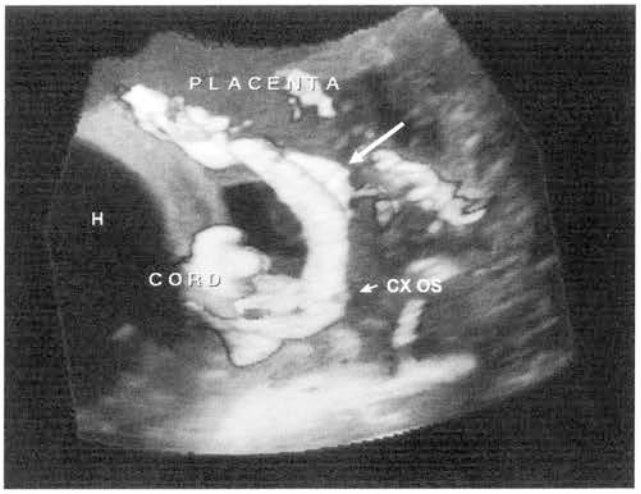


Fig. 2

Figure 1. — Prenatal diagnosis of vasa previa at the 30th week through 2DUS in color Doppler mode. Transabdominal longitudinal cut plane at the level of the internal cervical os shows an anomalous vessel (white arrow). CX OS - cervical os; 2DUS - two-dimensional ultrasonography; CORD - velamentous cord insertion; H - fetal head.
Figure 2. — Prenatal diagnosis of vasa previa through 3DUS in power Doppler mode. It is possible to observe the architecture of the anomalous vessels around the internal cervical os (white arrow). 3DUS - three-dimensional ultrasonography; CX OS - cervical os; CORD - velamentous cord insertion; H - fetal head.

Discussion

Vasa previa presents at an incidence of one case for every 2,000-5,000 births [6]. It is classified in two types. Type I results from velamentous insertion of the umbilical cord, while in type II the vessels running to the internal cervical os are connected to a bilobed or succenturiate placenta [7].

The known risk factors for vasa previa include low-lying placentae in the second trimester, placentae with accessory lobes, multiple pregnancies, and gestations resulting from in vitro fertilization. Women with those conditions could benefit from a routine ultrasound evaluation of the insertion site of the cord in the placenta [8].

The best neonatal results are obtained through prenatal ultrasound diagnosis and elective cesarean before rupture of the membranes. When the diagnosis is not made prenatally, half the fetuses die, and the average Apgar index among survivors is low (average of 1 in the 1st and 4 in the 5th minute) [4].

A diagnosis of vasa previa through 2DUS is based on the viewing of linear or tubular echogenic structures on a gray scale at the level of the internal cervical os. Color Doppler, power Doppler or transvaginal ultrasound can be used to evaluate suspected cases [2]. However, the precise location of an aberrant vessel is not always evident with the use of conventional ultrasound on gray scale or through Doppler ultrasonography alone [3].

The 3DUS allows the evaluation of the spatial relationship between the anomalous vessels and the internal cervical os. A multiplanar mode allows an infinite number of orthogonal planes to be obtained thus permitting viewing from different perspectives. The additional use of niche and power Doppler modes enhances the sensitivity in detection of anomalous vessels [3]. The 3DUS in power Doppler mode also permits a precise mapping of anomalous vessels, which is very important for an adequate surgical incision of the uterus during cesarean section. It also permits a clearer and easier understanding of the pathology by both doctors and patients [5].

In our case, the patient had undergone in vitro fertilization, a known risk factor for vasa previa [8]. The suspected diagnosis was based on the presence of a low-lying placenta with velamentous insertion of the cord. The diagnosis was performed through transabdominal ultrasound in two-dimensional mode, confirmed by color Doppler; 3DUS in power Doppler mode was capable of promoting correct mapping of the anomalous vessels, something highly important for an adequate surgical incision of the uterus, thus avoiding laceration of the vessels which could cause severe exsanguination and fetal death.

We concluded that 3DUS can help in accurately locating aberrant vessels around the internal cervical os. It can also be highly useful in the therapeutic approach to those women, thus contributing to better perinatal results.

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