Vasa previa, does Doppler ultrasonography influence the outcome

Atyaf Hasan M
Al-Quraan Ghassan
Tayseer Rimawi

MD, Iraqi Specialty Centre for IVF. Iraq Baghdad

Corresponding author:
Al-Quraan GH, MD
Iraqi Specialty Centre for IVF.
Baghdad
Iraq
Email: quraangh@yahoo.com

Abstract

Aim and Objective: To address the significance of sonographic diagnosis of vasa previa in pregnancy outcome.

Materials and Methods: We performed a multicenter study in 3 private hospitals in Iraq during a 5 years period. Cases were obtained from the IVF centers and the obstetrician department in these hospitals. A prospective study was carried out; a total of 4,553 pregnant women at 18-20 weeks' gestation entered this study. During routine antenatal visit and ultrasound examinations, if the possibility of vasa previa was raised especially those in the high risk group (Table 1), the obstetricians were instructed to image the placental cord insertion with color Doppler imaging and classify this as normal or velamentous. These ultrasonographic findings obtained at 18-20 weeks' gestation were used for comparison with outcome data (clinical courses, perinatal outcomes, and placental pathology examinations).

Results: Eight cases of vasa previa were suspected at 18-20 gestational age among 4,553 women over a 5-year period. Six patients had confirmation of the diagnosis by the delivering obstetrician and/or placental examination (Figures 1-5). One of those women had preterm uterine contractions and one was allowed to deliver vaginally because subsequent late third-trimester scans showed that vasa previa was no longer present. All remaining 6 patients with confirmed vasa previa, were delivered by scheduled C-section and all infants had normal Apgar scores and survived.

Conclusion: Although vasa previa is a rare lethal complication, antenatal diagnosis is essential to improve fetal survival by colour Doppler ultrasonography. Once the diagnosis of vasa previa is made ,a Scheduled cesarean section is the preferred method of delivery at 36 weeks' gestation , or when fetal lung maturation has been confirmed, will greatly improve the outcome and prevent catastrophic complication associated with it.

Key words: Vasa previa,
Velamentous cord insertion, antenatal diagnosis - Colour Doppler

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Introduction

Literally vasa previa means “vessels in the way, before the baby“. It is one of the most unexpected and tragic accidents in obstetrics. The condition is unique as it bears no maternal, but a high fetal, mortality ranging from 50-60% with intact membranes to 70-l 00% with ruptured membranes(1, 2), with a prevalence of 1.5-4:10,000(3, 4) of which 10% occur in twins(5). In vasa previa fetal vessels crossing or running in close proximity to the inner cervical os (unsupported by the umbilical cord or placental tissue) , pose a high risk of rupture and fetal demise if not recognized before rupture of membranes. It can lead to fetal hemorrhage (Benkiser’s Syndrome) by rupture of vasa previa during labour, which may be followed by fetal death in 60-70% of cases (Michaels, 1955; Fox,1978). It is vital to recognize risk factors (Table 1) for vasa previa and diagnose this condition before the onset of labor so that fetal shock or demise is prevented. This study, which began in 2010 January 1, was prompted by the observation of a velamentous insertion of the cord using colour Doppler ultrasound.

Velamentous insertion of the cord was first described by Wrisburg (1) in 1773. Lobstein reported the first case of rupture vasa previa in 1801 (6) and the first ultrasound description of vasa previa dates back to 1987 (21). Before ultrasound became a common practice, the diagnosis of vasa previa was often made (too late) on the triad of ruptured membranes, painless vaginal bleeding and fetal distress or demise. During that era, the perinatal mortality rate associated with late identification of vasa previa ranged from 58–73%(22,23). Gray-scale ultrasonography has improved our ability to detect vasa previa(24,25); advances in ultrasound and the extensive experience gained over this long period have led to improved ability of color flow Doppler ultrasound in the diagnosis of this rare anomaly. Although several studies have reported the importance of using color or power Doppler ultrasound for the prenatal diagnosis of vasa previa(26,27,28,29,30), the accuracy of this technique for diagnosing vasa previa is not known, nor is the true incidence of this condition because even in skilled centers, specifically attempting to identify vasa previa, some cases are likely to be missed. Antepartum diagnosis is associated with improved outcomes and also facilitates elective delivery under controlled circumstances that allow rapid access to volume replacement and blood products, but does not eliminate morbidity and mortality of these rare placental anomalies. The aim of our study was to assess the influence of colour Doppler ultrasound on the outcome and to demonstrate the importance of detection and early response to achieve an optimal outcome. Finally, early recognition of this rare placental anomaly is necessary to avoid the extremely high fetal morbidity and mortality rate(27). However, infant death can still occur and elective preterm delivery may be associated with extended newborn hospitalizations from other complications of prematurity.

Materials and methods

The Human Investigation Committee at Al-Jadriah private Hospital in Baghdad approved this multicenter study in cooperation with other committees. All gravidas in the period between the 1st of January 2010 until 31 of December 2014 were entered into this study. Women were scanned with a variety of ultrasound systems that provided a variety of gray-scale, color and endovaginal capabilities, in their second and third trimesters. We attempted to view the internal cervical os of 4,553 women with second trimester pregnancies during a 5–year period ,and if the possibility of vasa previa was raised , especially in those with high risk factors, the diagnosis was confirmed by colour-flow Doppler mapping of the lower uterine segment and cervical os. Ultrasonographic findings were correlated with clinical courses, perinatal outcomes, and placental pathology examinations.

Discussion

Vasa previa is a rare occurrence. Vago and Caspi (31) report an incidence of this condition of 1:2761. It is precisely because of this rarity that the condition is often not diagnosed or even considered. The major unexpected and catastrophic complication from vasa previa is the rupture of the vessels carrying fetal blood, which lack the protection of Wharton’s jelly (32,33,34). This bleeding from a ruptured vasa, causing fetal exsanguination and death, occurs at or near delivery if the condition is undetected and results in a reported perinatal mortality rate in 50-60 % with intact membranes and 75-100 % with ruptured membrane’s(35,36,37).

The outcome is markedly improved when a prenatal diagnosis is done followed by elective C-section. The reduction in the fetal mortality depends on a Prenatal identification of a vasa previa, the desirable clinical goal, since these pregnancies have higher risks for adverse perinatal outcome. The use of colour flow imaging makes the reduction in the fetal mortality possible, especially in those pregnancies at high risk (Table 1). Ultrasound examination and colour-flow Doppler mapping of the lower uterine segment and cervical os in the second trimester is of great help and should result in vasa previa being easier to diagnose and becoming an increasingly rare cause of perinatal mortality.

In this prospective multicenter study all patients had 3 ultrasound examinations, 2 of which included transvaginal examinations of the cervix. All obstetricians were alerted to recognize the identified risks for vasa previa (Table 1) and the differential diagnosis of vasa previa on ultrasound (Table 2) 40. The condition was suspected in 8 pregnancies and confirmed in 6. One of the 8 patients had regression of the vasa previa noted on late third trimester rescanning and had uneventful vaginal delivery and one had preterm uterine contraction. We describe a successful outcome after detection of vasa previa during a second trimester scan with color Doppler imaging. In all cases of confirmed diagnosis of vasa previa the pregnancy proceeded uneventfully and healthy infants were born by scheduled caesarean section, which is considered the safest and preferred mode(38,39) of delivery in such an anomaly to avoid serious complications of fetal bleeding. Current evidence suggests that antenatal diagnosis of vasa previa

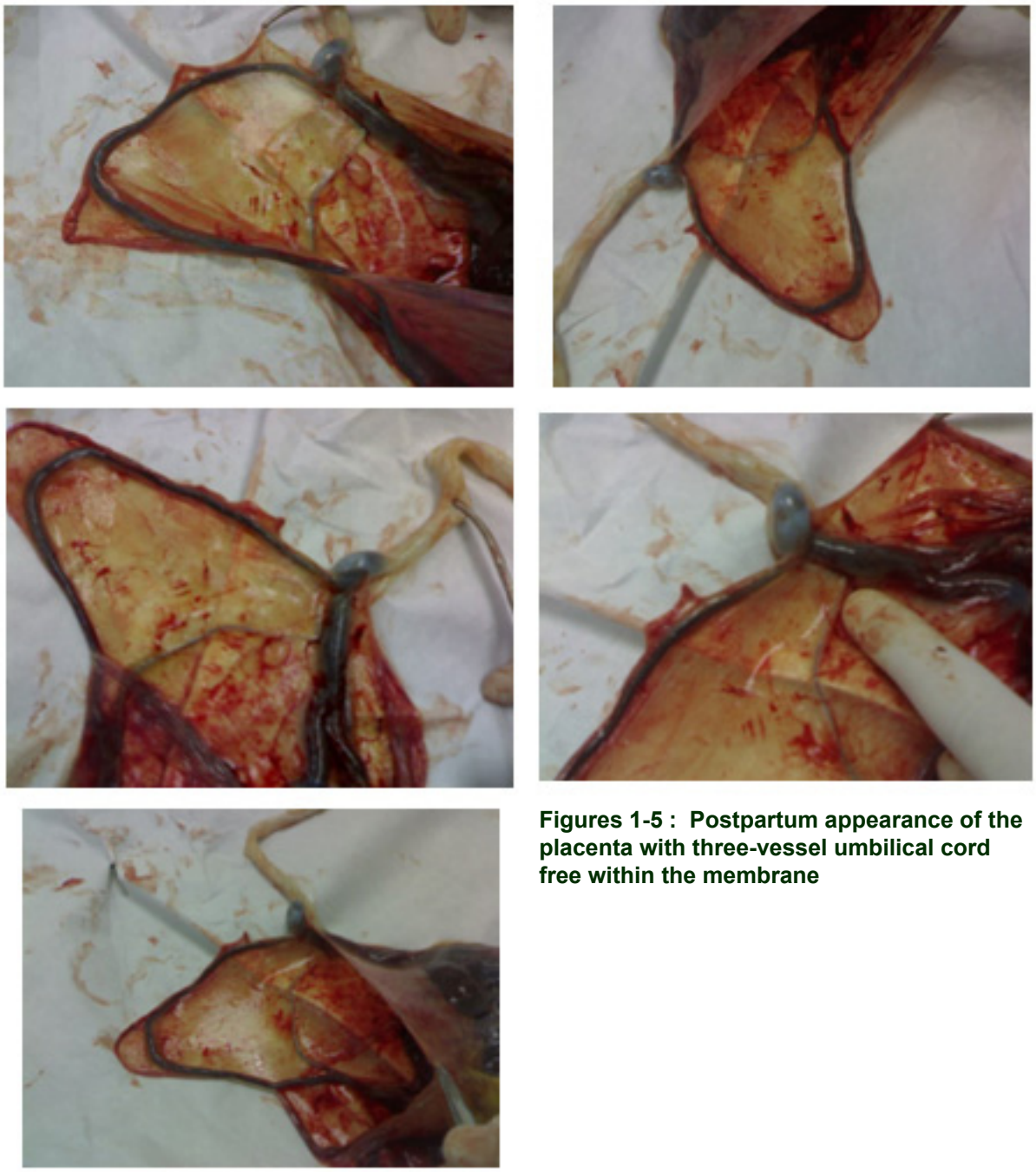
Table 1: Risk factors for vasa previa*

No	Risk factor	Reference
1	Placenta previa	9
2	Low-lying placenta	7,8
3	Multiple pregnancy	10
4	Multi-lobate placentas and velamentous cord insertion 1% in singleton 10% multifetal pregnancies	 20 11-13
5	Placenta membranacea	19
6	In-vitro fertilization about 1:300 pregnancies	14-17 18

** Information from references 7 and 20*

Table 2: Differential Diagnosis of Vasa Previa suspected on Ultrasound

1	Chorioamniotic membrane separation
2	Normal cord loop
3	Marginal placental vascular sinus
4	Amniotic band



Figures 1-5 : Postpartum appearance of the placenta with three-vessel umbilical cord free within the membrane

is associated with improved outcomes. Evaluation of all patients in high risk groups (Table 1) with transvaginal color flow Doppler should be considered for better outcome.

Conclusion

Although vasa previa is a rare lethal complication, antenatal diagnosis by colour Doppler ultrasonography is essential to improve fetal survival, but does not eliminate morbidity and mortality of this rare placental anomaly and physicians must be vigilant whenever amniotomy is performed, because all cases of vasa previa cannot be identified antenatally.

Once the diagnosis of vasa previa is made, a scheduled cesarean section is the preferred method of delivery at 36 weeks' gestation, or when fetal lung maturation has been confirmed; will greatly improve the outcome and prevent catastrophic complications associated with it.

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