Scientific Research Publishing

Open Journal of Obstetrics and Gynecology, 2024, 14, 234-239
https://www.scirp.org/journal/ojog
ISSN Online: 2160-8806
ISSN Print: 2160-8792

Velamentous Cord Insertion: Interest of Antenatal Diagnosis and Review of the Literature

Karam Harou, Aboubacar Sidiki Sidibe, Hicham Abdelkhalki, Abderaouf Soummani

Department of Obstetrics and Gynecology, Caddi Ayyad University Medical Hospital Med VI, Marrakech, Morocco
Email: aboubacar6591@gmail.com

How to cite this paper: Harou, K., Sidibe, A.S., Abdelkhalki, H. and Soummani, A. (2024) Velamentous Cord Insertion: Interest of Antenatal Diagnosis and Review of the Literature. *Open Journal of Obstetrics and Gynecology*, **14**, 234-239.
https://doi.org/10.4236/ojog.2024.142021

Received: May 7, 2023
Accepted: February 19, 2024
Published: February 22, 2024

Abstract

Velamentous insertion of the umbilical cord corresponds to the insertion of the cord directly on amniotic membranes. It is a rare situation whose frequency varies from 0.5% to 1.69% of single pregnancies. It must be diagnosed during the morphological ultrasound of the 2nd trimester, actively looking for the association with a vasa previa, due to the risk of fetal haemorrhagic threat. We report an antenatal diagnosis of velamentous cord insertion and its management with literature review.

Keywords

Velamentous Cord Insertion, Vasa Previa, Antenatal Diagnosis, Ultrasound Doppler, Benckiser's Hemorrhage

1. Introduction

The umbilical cord inserts into the central part of the placenta, the velamentous insertion is when the cord is located on the amniotic membranes. This is a rare situation with a frequency ranging from 0.5% to 1.69% of singleton pregnancies [1] [2].

The diagnosis is often late in our context; however, antenatal diagnosis has transformed the prognosis by changing the obstetrical strategy from the diagnosis to the delivery, actively looking for the association with a vasa previa. The last one is the most abnormality, it represents a vital haemorrhagic threat for the fetus, secondary to the spontaneous rupture of amniotic membranes called benkisser's hemorrhage.

In this work we report a case of velamentous cord insertion and we focus on the interest of antenatal diagnosis in order to prevent complications related to

this entity.

2. Observation

A 35 years old patient, without any medical history, primigravida primiparous, admitted to the emergency unit at 26 weeks of pregnancy. She complained of pelvic pain. Clinical examination was normal and the ultrasound examination reveals a posterior placenta far from the cervix and an oblong image reminiscent of the umbilical cord interposed between the presentation and the uterine fundus, there was no associated vasa previa (Figure 1, Figure 2). The patient was treated for threatened premature delivery and we gave the patient an appointment for a regular follow-up at the day hospital, unfortunately she was lost to follow-up.

The patient went into spontaneous labor at 36 weeks of amenorrhea without any complications with a vaginal delivery. The cardiotocography interpretation during labor was normal. The placenta examination after delivery confirmed velamentous cord insertion (Figure 3).

Figure 1. Cord insertion on the membranes with no wharton jelly on the cord.

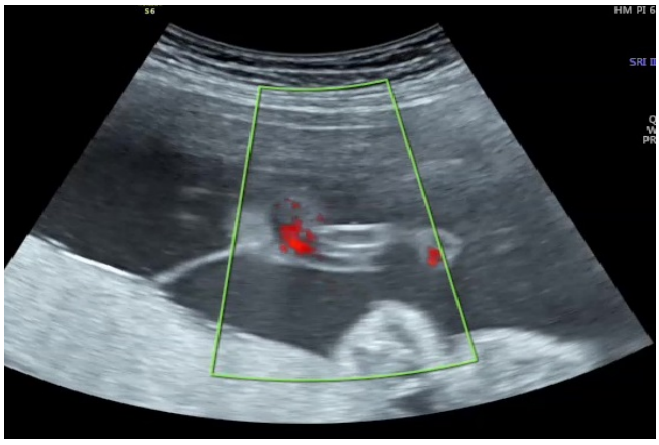

Figure 2. Insertion of the cord directly on membranes as evidenced by the color doppler of the structure.

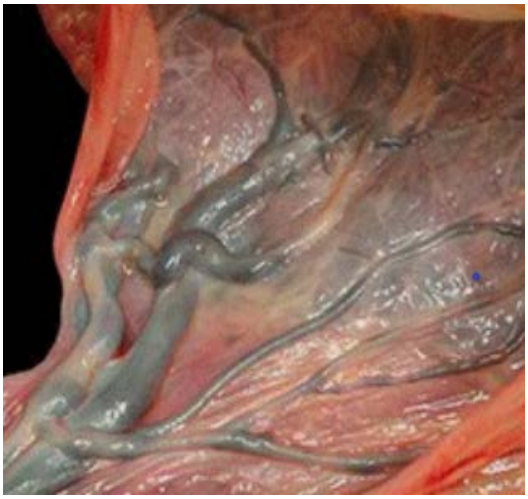

Figure 3. Velamentous cord insertion.

3. Discussion

Velamentous cord insertion corresponds to the insertion of the cord directly at the level of the amniotic membranes. Umbilical vessels containing fetal blood extend from the membranes and run under the amnion, unprotected by Wharton's jelly. Its frequency increases significantly up to 15% in monochorionic twin pregnancies [3].

The exact ethiopathogeny remains unknown, but an abnormality of primary implantation is the main among various theories proposed. Various risk factors are well known: assisted reproductive technologies, multiply the risk of velamentous insertion by 14; multiple pregnancies are also a major risk factor [4]. Placental morphological abnormalities (lobate placenta, placenta previa, accessory cotyledon) and single umbilical artery are frequently associated [5].

The main risk of velamentous cord insertion is its association with a vasa previa which represents 1/1200 to 5000 pregnancies [6], it corresponds to is the presence of an umbilical vessel, unprotected by the cord or the placenta, just opposite the internal orifice of the cervical canal. Two types exist in the literature [7]: type I is typically associated with a velamentous cord insertion or a low inserted placenta, while type II is found in case of bilobed placenta or accessory cotyledon.

The lack of protective jelly around the vessels creates a risk of compression that can lead to decelerations of the fetal heart rate [8]. The other major complication is a vascular tear due to spontaneous or artificial amniotic membranes rupture, which causes severe fetal hemorrhage called Benckiser's hemorrhage, which is fatal for the fetus in 75% to 100% of cases. Fetal extraction should be performed by cesarean section as a matter of extreme emergency, bearing in mind that the flow rate of a vasa previa is approximately 500 ml/min, whereas the blood volume of a full-term neonate is only 80 to 100 ml/kg [9] [10].

The velamentous cord insertion may be associated with other complications during pregnancy, such as intrauterine growth retardation (IUGR), small size for

gestational age or risk of congenital abnormalities [11] [12]. Indeed, the mechanical compression of the "exposed" umbilical vessels may be responsible for chronic fetal hypoxia, impaired venous return and intravascular thrombosis [11]. As for prematurity, De Los Reyes et al. confirmed an increased risk of prematurity in their meta-analysis [13], however none of the studies included in this analysis distinguish spontaneous prematurity from iatrogenic prematurity. The incidence of caesarean section, placental abruption and fetal death in utero (FIDU) is also increased [14].

The management of this entity is essentially based on its antenatal diagnosis. This diagnosis determines the vital prognosis of the fetus. During pregnancy, apart from labor, there are no clinical signs to suspect a velamentous insertion of the cord or a vasa previa. Only imaging, particularly ultrasound, can reveal these abnormalities. Because of its low prevalence, the guidelines do not recommend routine screening for vasa previa in the general population during morphologic ultrasound. However, targeted screening is recommended in case of risk factors [15]. In this case, endovaginal ultrasound has a good awareness, with a favorable cost/benefit ratio [16]. It allows a preventive strategy to implement. During labor, on the other hand, the clinical examination of any patient with intact membranes must imperatively exclude the presence of a vasa previa. It is diagnosed by palpation of a pulsatile structure running along the membranes. In this case, artificial rupture of the membranes and vaginal delivery are strictly prohibited.

The ultimate goal of antenatal diagnosis is adequate management of the delivery, to plan a cesarean section before spontaneous rupture of the membranes in case of associated vasa previa, while minimizing the risk of prematurity. There is currently no clear consensus on the appropriate timing of this elective cesarean section. The Royal College of Obstetrics and Gynaecology (RCOG) recommends cesarean section between 34 and 36 days of gestation [17]. In the management, the risk of prematurity must be compared to the risk of spontaneous amniotic membranes rupture; in their latest recommendations of January 2019, hospitalization between 30 and 32 SA for fetal maturation treatment with corticosteroids should be considered, especially in the presence of additional risk factors for prematurity. Ideally, the vessels should be located during the procedure to allow incision of the membranes at a distance from them. Velamentous cord insertion on the lower uterine segment is similar to vasa previa and presents a very high risk of fetal loss due to the complications inherent to vasa previa, in which case the same management as a vasa previa is proposed [18]. Other cases of velamentous Cord Insertion may be offered an attempted vaginal delivery with the possibility of an emergency cesarean section. During labor, variable decelerations in particular should be considered as a warning sign of abrupt fetal heart rate abnormalities.

4. Conclusion

Velamentous cord insertions are rare but risk situations exist such as: low in-

serted placenta, twin pregnancy, assisted reproductive technologies, placenta with morphological abnormalities; however, the antenatal diagnosis of vasa previa should be performed systematically by endovaginal doppler ultrasound, this will allow prophylactic cesarean sections to be scheduled in case of positive diagnosis before any labor and at the same time reduce neonatal morbidity and mortality.

Conflicts of Interest

The authors declare no conflicts of interest.

Contributions of the Authors

All authors contributed to the management of the patient and the drafting of the manuscript. The authors have read and approved the final version of the manuscript.

References

[1] Eddleman, K.A., Lockwood, C.J., Berkowitz, G.S., Lapinski, R.H. and Berkowitz, R.L. (1992) Clinical Significance and Sonographic Diagnosis of Velamentous Umbilical Cord Insertion. *American Journal of Perinatology*, **9**, 123-126. https://doi.org/10.1055/s-2007-994684

[2] Heinonen, S., Ryynanen, M., Kirkinen, P. and Saarikoski, S. (1996) Perinatal Diagnostic Evaluation of Velamentous Umbilical Cord Insertion: Clinical, Doppler, and Ultrasonic Findings. *Obstetrics & Gynecology*, **87**, 112-127. https://doi.org/10.1016/0029-7844(95)00339-8

[3] Kent, E.M., Breathnach, F.M., Gillan, J.E., *et al.* (2011) Placental Cord Insertion and Birthweight Discordance in Twin Pregnancies: Results of the National Prospective ESPRiT Study. *American Journal of Obstetrics & Gynecology*, **205**, 376.e1-7. https://doi.org/10.1016/j.ajog.2011.06.077

[4] Schachter, M., Tovbin, Y., Arieli, S., *et al.* (2002) *In vitro* Fertilization Is a Risk Factor for Vasa Previa. *Fertility and Sterility*, **78**, 642-643. https://doi.org/10.1016/S0015-0282(02)03253-3

[5] Suzuki, S. and Kato, M. (2015) Clinical Significance of Pregnancies Complicated by Velamentous Umbilical Cord Insertion Associated with Other Umbilical Cord/Placental Abnormalities. *Journal of Clinical Medicine Research*, **7**, 853-856. https://doi.org/10.14740/jocmr2310w

[6] Ruiter, L., Kok, N., Limpens, J., *et al.* (2015) Systematic Review of Accuracy of Ultrasound in the Diagnosis of Vasa Previa. *Ultrasound in Obstetrics & Gynecology*, **45**, 516-522. https://doi.org/10.1002/uog.14752

[7] Catanzarite, V., Maida, C., Thomas, W., *et al.* (2001) Prenatal Sonographic Diagnosis of Vasa Previa: Ultrasound Findings and Obstetric Outcome in Ten Cases. *Ultrasound in Obstetrics & Gynecology*, **18**, 109-115. https://doi.org/10.1046/j.1469-0705.2001.00448.x

[8] Antoine, C., Young, B.K., Silverman, F., *et al.* (1982) Sinusoidal Fetal Heart Rate Pattern with Vasa Previa in Twin Pregnancy. *Journal of Reproductive Medicine*, **27**, 295-300.

[9] Silver, R.M. (2015) Abnormal Placentation: Placenta Previa, Vasa Previa and Placentaaccreta. *Obstetrics & Gynecology*, **126**, 654-668.

https://doi.org/10.1097/AOG.0000000000001005

[10] Gagnon, R., Morin, L., Bly, S., Butt, K., Cargil, Y.M., Denis, N., *et al.* (2010) Diagnostic Imaging Committee; Maternal Fetal Medicine Committee. SOGC Clinical Practice Guideline: Guidelines for the Management of Vasa Previa. *International Journal of Gynecology & Obstetrics*, **108**, 85-89.

[11] Bohîlţea, R.E., Cîrstoiu, M.M., Ciuvica, A.I., *et al.* (2016) Velamentous Insertion of Umbilical Cord with Vasa Praevia: Case Series and Literature Review. *Journal of Medicine and Life*, **9**, 126-129.

[12] Muller, P. and Dellenbach, P. (1968) Anomalies du cordon ombilical et malformations foetales. *Revue Française de Gynécologie et d' Obstétrique*, **63**, Article 601.

[13] De Los Reyes, S., Henderson, J. and Eke, A.C. (2018) A Systematic Review and Meta-Analysis of Velamentous Cord Insertion among Singleton Pregnancies and the Risk of Preterm Delivery. *International Journal of Gynecology & Obstetrics*, **142**, 9-14. https://doi.org/10.1002/ijgo.12489

[14] Sinkin, J.A., Craig, W.Y., Jones, M., *et al.* (2018) Perinatal Outcomes Associated with Isolated Velamentous Cord Insertion in Singleton and Twin Pregnancies. *Journal of Ultrasound in Medicine*, **37**, 471-478. https://doi.org/10.1002/jum.14357

[15] Cipriano, L.E., Barth, W.H. and Zaric, G.S. (2010) The Cost-Effectiveness of Targeted or Universal Screening for Vasa Praevia at 18-20 Weeks of Gestation in Ontario. *BJOG*, **117**, 1108-1118. https://doi.org/10.1111/j.1471-0528.2010.02621.x

[16] McQueen, V., Speed, M., Rutter, S. and Gray, T. (2018) Vasa Praevia: Should We Routinely Screen High-Risk Women for This Rare But Serious Condition? *Ultrasound*, **26**, 127-131. https://doi.org/10.1177/1742271X17747137

[17] Jauniaux, E., Alfirevic, Z., Bhide, A.G., *et al.* (2019) Vasa Praevia: Diagnosis and Management: Green-Top Guideline No. 27b. *BJOG*, **126**, e49-e61. https://doi.org/10.1111/1471-0528.15307

[18] Hasegawa, J., Matsuoka, R., Ichizuka, K., Sekizawa, A. and Okai, T. (2006) Velamentous Cord Insertion: Significance of Prenatal Detection to Predict Perinatal Complications. *Taiwanese Journal of Obstetrics and Gynecology*, **45**, 21-25. https://doi.org/10.1016/S1028-4559(09)60185-6