INTRODUCTION

Introduction. The human umbilical cord are like fibers in a rope that connects the developing embryo/fetus to the placenta and literally acts as a ‘life line’ supplying the fetus with oxygen and nutrients that support its growth and development throughout the duration of pregnancy. The umbilical cord is attached to the placenta, which transfers oxygen, nutrients and from and to the maternal blood circulatory system without any direct contact between fetal and maternal blood. The exterior surface of the cord is normally comprised of two umbilical arteries and one umbilical vein (figure 1) which are continuous with the blood vessels in the chorionic villi of the placenta. These vessels are ensaced in a protective, gelatinous substance known as Wharton’s jelly.

Type of anomalies. There are described a series of umbilical cord abnormalities:

- Cord length
  - Short Cords - less than 35 cm
  - Long Cords - more than 70 cm
- Number of vessels
  - Two Vessel Cords - one artery / one vein
- Four Vessel Cords - two arteries / two veins
- Place of cord insertion on the placenta
  - Velamentous insertions - inserted on the membranes
  - Marginal insertions - inserted on the placental edge
- Constriction of the Umbilicus - lack of Wharton’s jelly at the fetal insertion
- Straight Cords - parallel arteries and veins with no Wharton’s jelly
- Wharton’s jelly cysts
  - Mucinous
  - Myxoid
  - Edema
- Growth of the umbilical cord
  - Umbilical Artery Aneurysms
  - Umbilical Vein varixes / False knots
  - Hematoma/Teratoma/Thrombosis/rupture

PATHOLOGY OF THE UMBILICAL CORD

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INTRODUCING REVIEW

Umbilical vein varix is an uncommon malformation that represents the dilatation of the umbilical cord. It can cause fetal abnormalities. Until delivery, we recommend periodic fetal monitoring, ultrasound scans. After delivery, the umbilical vein varix does not cause problems for the baby as the flow between the umbilical vein stops. Often is present a false umbilical knot (figure 3) which has no pathological signification and the ultrasound examination cannot establish exactly the diagnosis.

Defect at the insertion. The cord entry into the abdomen forms the button belly. A significant birth defect is represented by the abnormal insertion of the cord into the abdomen that is called omphalocele. This requires surgery after birth to repair. Some cases are believed to be due to an underlying genetic disorder.

Persistent right umbilical vein. Persistent right umbilical vein is a vascular pathology in which the left umbilical vein becomes occluded and the right umbilical vein persists and remains open. In the normal fetus, the right umbilical vein begins to obliterate around the fourth week of gestation and disappears by the seventh week of gestation. The persistence of the right umbilical vein increases the rates of fetal abnormalities. In this case we recommend targeted sonogram and fetal echocardiogram.

Membranous cord insertion is common in multiple gestations. It is frequently associated with single umbilical artery, fetal growth problems, preterm birth, with heart rate abnormalities during labor. These conduct to a higher number of instrumental delivery or cesarean section.

Velamentous insertion. There is a danger that spontaneous rupture of the membranes can be
accompanied by tearing of a cord vessel, which will lead to severe hemorrhage and fetal exsanguinations. It can be associated with low birth weight, prematurity, and abnormal fetal heart patterns in labor.1,10

Figure 5. True knot

Vasa Previa. The estimated incidence of vasa previa is approximately 1 in 2,500 deliveries. Undiagnosed vasa previa is associated with a perinatal mortality of approximately 60%.11 This is a very uncommon condition and is associated with velamentous insertion where some of the fetal blood vessels in the membranes lie across the cervical or below the fetal insertion. These are at risk of rupture when the fetal membranes supporting them rupture.

Figure 6. Ultrasound evidence of the umbilical cord coiling

Cord knots. Less commonly, but with potentially devastating consequences, the umbilical cord can become knotted (figure 5). They are believed to be formed when the fetus is most mobile within the uterus (13-26 weeks). Knots are rarely diagnosed in utero. The antenatal testing in the follow-up of pregnancies with this condition is uncertain.12

Figure 7. Antepartum fetal death due to vascular strangulation

Torsion is the condition of the umbilical cord where twists are superimposed on the cord itself. Using the ultrasound examination can be appreciating the coiling index (figure 6). An abnormal umbilical coiling index has been reported to be related to adverse fetal outcomes.1316 The hyper coiled cord - is rare. Hyper twisting can lead to intrauterine fetal demise by compressing the fetal vessels beyond the capacity of the Wharton’s jelly to protect them.

Nuchal Cord (cord around the neck) occurs when the umbilical cord becomes wrapped around the fetal neck 360 degrees. Nuchal cords are very common, with prevalence rates of 6% to 37%.12,17 Up to half of nuchal cords resolve before delivery is often detected in ultrasonography. The fetal death can appear a possible accident of the nuchal cord (figure 7).

CONCLUSIONS

Umbilical cord abnormalities are numerous and can have more or less clinical significance. The ultrasound can be useful to establish the associated pathology of the umbilical cord. These cases need more attention in pregnancy and delivery to prevent fatal events.

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