# Umbilical Cord Abnormalities

**Purpose**: To assist OB providers managing women with umbilical cord abnormalities in pregnancy.

**Single Umbilical Artery (SUA)**

Definition: A variation of umbilical cord anatomy in which there is only one umbilical artery.

* Occurs in 1/200 singleton deliveries; more common in twins
* Most cases are isolated
* Associated with increased risk of additional congenital malformations (25-30%), IUGR (10-20%) and preterm delivery (15%)
* If additional malformations are present, increased risk of perinatal mortality

Recommendations:

1. Referral to MFM for detailed anatomy ultrasound
2. If isolated SUA:

* No indication for genetic testing
* No indication for fetal echocardiogram
* Growth ultrasounds at 28 and 34 weeks
* No indication for antenatal testing
* Deliver at term for standard obstetric indications

1. If SUA with additional malformations:

* Offer genetic testing – there is a 50% chance of aneuploidy with additional malformations
* Fetal echocardiogram at 22-26 weeks
* Growth ultrasounds at 28, 32 and 36 weeks
* Twice weekly NSTs starting at 32 weeks
* Deliver at 39 weeks, unless indicated earlier
* Perform cesarean section for standard obstetric indications

**Umbilical Vein Varix**

Definition: Focal dilation of the intraabdominal umbilical vein measuring >9 mm diameter or intraabdominal umbilical vein diameter that is 50% larger than intrahepatic umbilical vein

* Found in 1/1,000 pregnancies
* 2/3 of cases are diagnosed after 28 weeks gestation
* Most do not enlarge significantly during pregnancy
* Increased risk for additional malformations (20-30%), IUGR (5-10%), varix thrombosis (1%) and IUFD (5-15%)

Recommendations:

* Referral to MFM for detailed anatomy ultrasound
* Offer genetic testing if any additional abnormalities
* MFM ultrasound to evaluate for varix size and flow and fetal hydrops every 1-2 weeks
* Twice weekly NSTs starting at 32 weeks
* Deliver at 37 weeks
* Perform cesarean section for standard obstetric indications

**Marginal Cord Insertion**

Definition: Umbilical cord insertion <2 cm from the placental edge

* Found in 2-10% of pregnancies
* More common in monochorionic twins
* Not associated with pregnancy complications

Recommendations:

* Routine prenatal care
* No indication for growth ultrasounds
* No indication for antenatal testing
* Deliver at term for standard obstetric indications

**Velamentous Cord Insertion**

Definition: Umbilical cord insertion into the membrane rather than into the placenta

* Occurs in 1% of all pregnancies
* More common in multiple gestations and in the setting of placenta previa
* Increased risk for IUGR (15-20%), preterm delivery (10-15%), abruption (5-10%), vasa previa (3-5%) and need for manual removal of the placenta (15%)

Recommendations:

* Referral to MFM for detailed anatomy ultrasound and transvaginal ultrasound to assess for vasa previa
* Growth ultrasounds at 28, 32 and 36 weeks
* No indication for antenatal testing
* Deliver at term for standard obstetric indications
* Perform cesarean section for standard obstetric indications

**References:**

“Single Umbilical Artery.” *Fetology Diagnosis and Management of the Fetal Patient*, by Diana W. Bianchi, 2nd ed., McGraw-Hill Medical Pub. Division, 2010, pp. 746–749.

“Umbilical Cord Abnormalities.” *Fetology Diagnosis and Management of the Fetal Patient*, by Diana W. Bianchi, 2nd ed., McGraw-Hill Medical Pub. Division, 2010.

Harris, Robert D, et al. “Ultrasound Evaluation of the Placenta and Umbilical Cord.” *Ultrasonography in Obstetrics & Gynecology*, by Peter W Callen, 5th ed., Saunders, 2008, pp. 721–757.

“Placenta, Membranes and Umbilical Cord.” Diagnostic Imaging *Obstetrics*, by Paula J. Woodward, 2nd ed., Amirsys, 2011.

[Thummala MR, Raju TN, Langenberg P. Isolated single umbilical artery anomaly and the risk for congenital malformations: a meta-analysis. J Pediatr Surg 1998; 33:580.](https://www.uptodate.com/contents/single-umbilical-artery/abstract/7)

[DeFigueiredo D, Dagklis T, Zidere V, et al. Isolated single umbilical artery: need for specialist fetal echocardiography? Ultrasound Obstet Gynecol 2010; 36:553.](https://www.uptodate.com/contents/single-umbilical-artery/abstract/41)

[Chen K, Akoma U, Anderson A, et al. Prenatally diagnosed single umbilical artery: The role and relationship of additional risk factors in the fetus for congenital heart disease. J Clin Ultrasound 2016; 44:113.](https://www.uptodate.com/contents/single-umbilical-artery/abstract/47)

[Gurram P, Figueroa R, Sipusic E, et al. Isolated Single Umbilical Artery and Fetal Echocardiography: A 25-Year Experience at a Tertiary Care City Hospital. J Ultrasound Med 2018; 37:463.](https://www.uptodate.com/contents/single-umbilical-artery/abstract/48)

Beraud, E., et al. “Umbilical Vein Varix: Importance of Ante- and Post-Natal Monitoring by Ultrasound.” *Diagnostic and Interventional Imaging*, vol. 96, no. 1, 2015, pp. 21–26., doi:10.1016/j.diii.2014.01.009.

Mankuta, David, et al. “Isolated Fetal Intra-Abdominal Umbilical Vein Varix.” *Journal of Ultrasound in Medicine*, vol. 30, no. 2, 2011, pp. 273–276., doi:10.7863/jum.2011.30.2.273.

Liu, Charles C., et al. “Sonographic Prenatal Diagnosis of Marginal Placental Cord Insertion.” *Journal of Ultrasound in Medicine*, vol. 21, no. 6, 2002, pp. 627–632., doi:10.7863/jum.2002.21.6.627.

Vintzileos, Anthony M., et al. “Using Ultrasound in the Clinical Management of Placental Implantation Abnormalities.” *American Journal of Obstetrics and Gynecology*, vol. 213, no. 4, 2015, doi:10.1016/j.ajog.2015.05.059.

Esakoff, Tania F., et al. “Velamentous Cord Insertion: Is It Associated with Adverse Perinatal Outcomes?” *The Journal of Maternal-Fetal & Neonatal Medicine*, vol. 28, no. 4, 2014, pp. 409–412., doi:10.3109/14767058.2014.918098.

Sinkin, Joshua A., et al. “Perinatal Outcomes Associated With Isolated Velamentous Cord Insertion in Singleton and Twin Pregnancies.” *Journal of Ultrasound in Medicine*, vol. 37, no. 2, 2017, pp. 471–478., doi:10.1002/jum.14357.

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