Uterine artery Doppler for abnormal placental cord insertion.

Marginal cord insertion most frequently defined as distance =/<2cm from nearest placental edge.

Marginal and velamentous cord insertions are defining phenotypic expressions of the chorion regression syndrome - the impaired placentation continuum. Both velamentous and marginal insertions reflect poor placental implantation with impaired development and function of placenta necessitating uterine artery Doppler to complete and optimize risk assessment for placenta-related adverse obstetrical outcomes.

Uterine artery Doppler is a validated non-invasive proxy for placenta ischemia due to impaired placentation and defective trophoblastic invasion. Uterine artery Doppler is a marker for defective remodeling of spiral arteries with consequent placental malperfusion and associated impaired fetal growth.
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Marginal cord insertion has been associated with a variably increased risk of adverse pregnancy outcome, but risks are generally less compared with velamentous insertion. The prevalence is ~6.15 percent.

Marginal cord insertion (MCI) is associated with a risk of placental abruption and preeclampsia with odds ratios of 1.5 with odds ratio for preterm delivery of 1.3; VCI odds ratios for abruption, preeclampsia, and PTD are 2.6, 1.5, and 2.0 respectively.

There are conflicting reports regarding the clinical significance of marginal insertion detected prenatally. In a study that subclassified marginal insertions into those located within 1 cm, between 1 and 2 cm, and between 2 and 3 cm, only those inserted within 1 cm were mildly associated with abnormal perinatal outcome. Therefore, it seems reasonable to reassure patients with a marginally inserted cord and avoid follow-up scans based solely on this finding.

MCI can develop into VCI as the pregnancy progresses as a result of atrophy of the placental tissue at the cord insertion. Alternatively placental trophotropism can increase the volume of placental tissue yielding a more supported and less vulnerable cord insertion.

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*Hasegawa. Velamentous cord insertion: significance of prenatal detection to predict perinatal complications. Taiwan J Obstet Gynecol 2006;45(1):21-5.
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Clinical correlates of normal and abnormal uterine artery doppler

Normal mean uterine artery pulsatility index has a high negative predictive value >90% mitigating against the subsequent development of the following clinical expressions of impaired placentation / placenta related adverse obstetrical outcomes - early onset preeclampsia, PTD <36 weeks, IUGR, abruption, stillbirth, NICU admission - in both low risk and high risk populations.

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*Obstetrics & Gynecology. 120(4):815-822, Oct 2012. Myatt. The utility of uterine artery Doppler velocimetry in prediction of preeclampsia in the low risk population.

Isolated abnormal uterine artery doppler after 26 weeks - even in the low risk population - confers increased risk for preeclampsia, IUGR, preterm delivery, C-section and NICU admission, abruption and stillbirth.

*Third trimester abnormal uterine artery Doppler findings are associated with adverse pregnancy outcomes. Shwarzman. J Ultrasound Med 2013; 32:2107-2113.
*Persistence of increased uterine artery resistances in the third trimester and pregnancy outcome. Ghi. Ultrasound Obst Gynecol. Nov 2010.