Uterine artery Doppler for placenta related end organ disease: the placenta-fetal brain axis - impaired placentation and risk assessment for placenta related adverse obstetrical outcomes including preeclampsia

Uterine artery Doppler is a validated non-invasive proxy for placenta ischemia due to impaired placentation and defective trophoblastic invasion - the pathogenesis of early onset preeclampsia and contributing factor to preterm preeclampsia. 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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Placenta-fetal brain axis - Neuro Placentology

Neuroplacentology is an emerging research area that explores the influences of placenta on normal and pathological fetal brain development. The placenta is vital for healthy fetal development, especially for the fetal brain. It primarily plays the role of an interface between the maternal and fetal circulations by enabling the exchange of nutrients, gases, and waste between the mother and fetus. The placenta is also the first functional endocrine gland since it produces, in a temporarily regulated manner, diverse hormones that support the pregnancy, regulate fetus and placenta growth, and prepare for childbirth.

It is now recognized that placental pathology or premature placental loss due to preterm delivery can alter the trajectory of fetal brain development or increase the susceptibility of the immature brain to injury.

A growing body of evidence has linked placental insufficiency to long-term neuropsychiatric disorders such as learning deficits, autism spectrum disorder, attention deficit hyperactivity disorder and schizophrenia.

The odds of a placental origin of neurobehavioral outcomes may be substantial since more than 10% of pregnancies are affected by some degree of placental failure, which includes preeclampsia, infection, or genetic anomalies. In addition, 10% of gestations end prematurely, leading to the abrupt loss of placenta for the newborn.

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