

An Integrated Method for Examining the Long-Term Health Effects of Placental Disorders

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Description

Placental pathology is a critical area of study in obstetrics and perinatal medicine, focusing on the examination and diagnosis of diseases and abnormalities in the placenta. The placenta, an essential organ in pregnancy, facilitates the exchange of nutrients, gases, and waste products between the mother and the fetus. It also produces hormones necessary for maintaining pregnancy. Pathological changes in the placenta can significantly impact both maternal and fetal health, potentially leading to adverse pregnancy outcomes. The placenta is a disc-shaped organ composed of maternal and fetal components. The maternal side is the decidua basalis, while the fetal side includes the chorionic plate and villi. The chorionic villi are the functional units where maternal-fetal exchange occurs. The mother's blood enters the intervillous gap, facilitating the passage of waste materials, nutrients, and oxygen between the villous membranes. Placental pathology can manifest in various forms, each associated with specific clinical implications. The main categories include placental insufficiency, inflammatory conditions, vascular disorders, and neoplastic lesions. Low-lying placentas and a premature placenta are two conditions that can damage the placenta during pregnancy or childbirth. Retained placenta is a condition in which after giving delivery, a portion of the placenta stays in the womb. Placental abruption is the beginning of the placenta's separation from the uterine wall.

Placental insufficiency occurs when the placenta cannot provide adequate oxygen and nutrients to the fetus, often resulting in Intrauterine Growth Restriction (IUGR) or preterm birth. Preeclampsia is a condition characterized by high blood pressure and proteinuria in the mother. It is associated with abnormal placentation and reduced blood flow to the placenta. Maternal Vascular Malperfusion (MVM) is an impaired blood flow in the maternal vessels supplying the placenta, leading to inadequate fetal oxygenation and nutrients. Infections and inflammatory responses can significantly affect the placenta, with the potential for severe fetal and maternal outcomes. Inflammations of the fetal membranes (amnion and chorion) usually occur due to bacterial infection. It is associated with preterm labor and neonatal infections. Abnormalities in placental blood vessels can lead to various complications. Maternal and Fetal Vascular Malperfusion (FVM) will occur in a conditions such as infarcts (areas of dead tissue due to lack of

blood supply) and thrombosis (blood clots) in the placental vessels. These can restrict blood flow, leading to fetal hypoxia and growth restriction. Placental Abruption is a premature separation of the placenta from the uterine wall, causing bleeding and potential fetal distress or demise.

Hydatidiform mole is a gestational trophoblastic disease where abnormal trophoblastic tissue proliferates. It can be complete or partial, with potential to develop into choriocarcinoma, a malignant form. Choriocarcinoma is a highly malignant tumor arising from trophoblastic cells, often following a molar pregnancy, but can also occur after normal or ectopic pregnancies. Diagnosis of placental pathology involves a combination of clinical assessment, imaging studies, and histopathological examination. Ongoing research in placental pathology aims to improve diagnostic techniques and therapeutic interventions. Advances in molecular biology and genetics have opened new avenues for understanding the pathophysiology of placental diseases. An organ that grows inside the uterus during pregnancy is the placenta. When the placenta detaches from the uterine wall prior to delivery, this condition is known as placental abruption. A placental abruption may cause the mother to bleed profusely and deprive the unborn child of oxygen and nourishment. Sometimes an early birth is required.

Biomarkers for early detection are to identifying specific biomarkers in maternal blood that can predict placental insufficiency or preeclampsia. Placental pathology encompasses a wide range of disorders that can significantly impact maternal and fetal health. Understanding these conditions is essential for the effective management of high-risk pregnancies and improving perinatal outcomes. Advances in diagnostic techniques and research into the underlying mechanisms of placental diseases hold promise for better prevention and treatment strategies in the future. Disorders associated to the placenta that are mostly unique to humans impact about one-third of pregnancies. These conditions may result in increased rates of maternal and fetal death and morbidity, which may have long-term effects on the mother's and the child's health. Through comprehensive examination and interdisciplinary collaboration, healthcare providers can address the complexities of placental pathology and ensure better health for both mother and child.