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<p>Abstract</p> <p>In high-risk pregnancies the chronic hypoxemic fetus redistributes its circulation to maintain the blood supply to the vital organs: brain, heart and adrenals. The aims of the studies included in this thesis were: 1) to establish reference curves for fetal cerebral venous blood velocity in normal pregnancies; 2) to determine in high-risk pregnancies the frequency of abnormal Doppler in the cerebral veins and uterine, umbilical and middle cerebral arteries and the umbilical vein and ductus venosus with correlation with adverse perinatal outcome; 3) to analyze the correlation between brain sparing and redistribution of circulation and placental vascular impedance; 4) to evaluate the correlation between brain sparing and fetal umbilical cord blood gases at birth.</p> <p>Pulsating Galen vein was seen in 8% of the normal and 58% of the high-risk pregnancies. The degree of brain sparing was strongly related to the increasing placental vascular resistance. Despite signs of brain sparing, the chronic hypoxemic fetuses managed to maintain their cord blood gases at birth. A strong correlation was found between signs of brain sparing and operative delivery for fetal distress, admission to neonatal intensive care unit, and small-for-gestational-age newborn. The results suggest that uterine, umbilical and middle cerebral arteries and Galen vein show early Doppler changes during surveillance, whereas the ductus venosus and umbilical vein might show late Doppler changes in cases of suspected chronic hypoxemia. Umbilical venous pulsations were most predictive of adverse perinatal outcome.</p>		
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