A longitudinal study of three dimensional ultrasound of the placenta in uncomplicated singleton pregnancies

경희대학교 의과대학 산부인과학학교실
정난희*, 정의, 설현주, 이보연, 정민형, 최영준, 김승보, 허주엽

목적: To investigate the relationship between birth weight and placenta weight, and 3D-power Doppler histogram of the human placenta in the first and second trimester of pregnancy and reproducibility of 3D-power Doppler ultrasound.

방법: In this longitudinal study, Doppler ultrasonography was performed in 54 nonsmoking women of singleton pregnancies at 10-12 weeks of gestation and subsequently at 19-21 weeks. Thereafter all women had an uncomplicated full-term delivery. Using the same pre-established settings for all cases, power Doppler was applied to each placenta. The 3D power Doppler histogram was used to determine vascular indices including placenta volume (PV), vascularization index (VI), flow index (FI) and vascularization flow index (VFI). For uterine artery Doppler recordings, pulsatility index (PI) was recorded for each side. Correlation coefficients (CCs) for PV, VI, FI, and VFI versus clinical and sonographic variables were calculated. The intraobserver and interobserver variability expressed as an intra- and inter-CC.

결과: The mean PV at the first- and second-trimester was 45.9 mL (range 11.6-104.1) and 182.7 mL (range 82.0-328.5), respectively. All vascular indices of the placenta as well as VI ($p=0.000$), FI ($p=0.022$) and VFI ($p=0.000$) showed the significantly increasing trend from first- to second-trimester. Birth weight and placenta weight had a significant association with FI ($r=0.364$, $p=0.021$; $r=0.509$, $p=0.009$) in the first trimester, but not in the second-trimester. The intraobserver reproducibility was very good for PV (intra-CC 0.96), VI (intra-CC 0.95), FI (intra-CC 0.93), and VFI (intra-CC 0.90), respectively. In addition, the inter-CCs were also good for PV (inter-CC 0.94), VI (inter-CC 0.75), FI (inter-CC 0.79), and VFI (inter-CC 0.74), respectively.

결론: FI of the placenta in the first-trimester has a statistically correlation with birth weight and placenta weight, likely reflecting degree of placental circulation in the first-trimester. Additionally, 3D-power Doppler ultrasound is reproducible for assessment of the placenta.