Correlations between foeto-maternal haemodynamic parameters and foetal growth velocity in a cohort of physiological singleton pregnancies

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Objective. Foetal growth is determined by the individual genetic growth potential and the function of foeto-maternal haemodynamic unit. The aim of this study was to determine the correlations between utero-placental and foeto-placental blood flow volume and maternal haemodynamics.

Materials and Methods. This was a prospective observational study which included 58 physiological singleton pregnancies. Patients were enrolled in the first trimester and underwent haemodynamic assessment with Ultrasonic Cardiac Output Monitor (USCOM) at 12, 20, 30 and 35 gestational weeks. Ultrasound assessment of foetal biometry and Doppler velocimetry was performed at 20, 30 and 35 weeks, including umbilical and uterine blood flow volume (UV-Q, UtA-Q). The Spearman rank coefficient was used to assess the correlations.

Results. The analysis showed that increase of Potential to Kinetic Ratio is directly proportional to UtA-Q (Rho = 0.52, $p < 0.001$). Furthermore, UV-Q was positively correlated with maternal cardiac output (Rho = 0.54, $p < 0.001$), and to lesser extent with stroke volume (Rho = 0.44, $p = 0.006$), heart rate (Rho = 0.33; $p = 0.04$) and inotropy (Rho = 0.36, $p = 0.03$).

Conclusions. Maternal haemodynamic parameters are correlated with uterine and foetal blood flow perfusion and supply. Understanding these correlations could improve clinical strategies to optimize maternal and neonatal outcomes.

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