First trimester USCOM assessment for the prediction of hypertensive disorders during pregnancy

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Objective. The maternal cardiovascular system adapts to pregnancy through complex physiological mechanisms. The aim of this study was to evaluate if the maternal haemodynamic assessment in normotensive women in the first trimester of pregnancy was predictive for the occurrence of hypertensive disorders during pregnancy.

Materials and Methods. This retrospective observational study included 329 healthy women underwent UltraSonic Cardiac Output Monitor (USCOM) to detect haemodynamic parameters during the screening for nuchal translucency at 11 to 14 weeks of gestation at the Prenatal Diagnosis Centre of the University of Naples Federico II from January 2022 to December 2023. Patients were followed until term, noting the appearance of hypertensive disorders and/or intrauterine growth restriction.

Results. 306 patients had an uneventful pregnancy (controls), while 23 (7.5%) developed hypertensive disorders (cases). USCOM showed higher systemic vascular resistance index, lower peak velocity of flow and higher potential to kinetic energy ratio in cases compared to controls (3,994.2 ± 1,175.3 *vs* 3,233.2 ± 1,373.7 dynes × s/cm^{5}m^2, $p < 0.019$; 0.8 ± 0.3 *vs* 0.9 ± 0.2 m/s, $p < 0.004$; 108.5 ± 53.3 *vs* 81.4 ± 45.2, $p < 0.019$, respectively).

Conclusions. Maternal haemodynamic assessment in the first trimester of pregnancy can identify early markers of altered cardiovascular adaptation that may lead to the development of hypertensive disorders in the third trimester of pregnancy.