Establishing normal ranges for maternal haemodynamic parameters using the Vicorder® device: experience from a single centre

Roberta **Erra** [1], Bronacha **Mylrea-Foley** [1], Giulia **Zamagni** [2,3], Jenny **Goodier** [4], Louisa **Jones** [4], Jasmine **Tay** [1], Lorenzo **Monasta** [2], Tamara **Stampalija** [2,5], Christoph **Lees** [1,*]

[1] Institute of Reproductive and Developmental Biology, Department of Metabolism, Digestion and Reproduction, Imperial College London, London, U.K.
[2] Institute for Maternal and Child Health IRCCS Burlo Garofolo, University of Trieste, Trieste, Italy.
[3] Department of Mathematics, Informatics and Geoscience, University of Trieste, Trieste, Italy.
[4] Women's Health Research Centre, Department of Metabolism, Digestion and Reproduction, Imperial College London, London, U.K.
[5] University of Trieste, Trieste, Italy.

DOI: 10.36129/jog.2024.S114

Objective. To establish normal reference ranges for haemodynamic parameters assessed with the Vicorder® device in a cohort of healthy pregnant women between 30 and 39 weeks gestational age.

Materials and Methods. We performed a prospective observational study of healthy women with singleton, non-anomalous pregnancies between 30+0 and 39+0 weeks gestational age recruited during routine antenatal appointments at a single inner city maternity unit. Participants with significant comorbidities at time of inclusion including cardiovascular disease, chronic or gestational hypertension, diabetes or estimated foetal weight < 10th centile were excluded. Haemodynamic assessments were conducted in standardised conditions with Vicorder® (Skidmore Medical Ltd). Data regarding cardiac output (CO), stroke volume (SV), heart rate (HR), mean arterial pressure (MAP), augmentation index (AIx), pulse wave velocity (PWV) and total peripheral resistance (TPR) were collected.

Results. 246 haemodynamic assessments performed in 176 participants were included in the analysis. HR does not change significantly with gestational age. The central haemodynamic parameters CO and SV significantly decrease with gestation between 30 and 39 weeks ($p < 0.01$) with a median decrease respectively of 0.09 L/min and 1.32 ml for each increase in gestational week. Conversely MAP ($p < 0.001$), TPR ($p < 0.001$) and arterial function parameters PWV and AIx increase significantly with gestation ($p < 0.0001$ and $p < 0.05$ respectively).

For each haemodynamic parameter of interest stratified by gestational week we developed the centile curve reflective of the model with the best fit and the crude median ± interquartile ranges.

Conclusions. CO, SV, MAP, SVR, PWV and AIx assessed with the Vicorder® haemodynamic device demonstrate significant change with gestation in uncomplicated pregnancies between 30 and 39 gestational weeks. Thus, normalization for gestational age and the use of Vicorder® specific reference ranges is recommended in future research utilising this maternal haemodynamic assessment machine.