

Correlation between maternal microvascular reactivity assessed by laser speckle contrast imaging and first trimester placental biomarkers

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DOI: 10.36129/jog.2024.S145

Objective. To study the correlation between first trimester serum biochemical and biophysical markers and parameters of microvascular reactivity using laser speckle contrast imaging (LSCI) combined with post-occlusive reactive hyperaemia (PORH).

Materials and Methods. We enrolled 53 women carrying a singleton gestation at the time of routine first trimester scans. Skin blood flux at the dorsal hand was recorded using LSCI coupled with PORH before, during, and after a 3-minute arterial occlusion. The peak flux and the base-to-peak flux were calculated and compared with levels of placental growth factor (PIGF), Pregnancy-associated protein-A (PAPP-A) and free beta human chorionic gonadotropin (free β -hCG), expressed as multiple of the median (MoM), and with maternal biophysical markers (mean arterial pressure; uterine artery pulsatility index).

Results. PIGF levels showed a moderate positive correlation with base-to-peak flux ($r = 0.51$, 95%CI 0.27-0.69) and a weak positive correlation with peak flux ($r = 0.31$, 95%CI 0.04-0.59). PAPP-A levels above the median were associated with higher base-to-peak flux compared to PAPP-A below the median ($p = 0.02$). A moderate positive correlation was also found between free β -hCG and peak flux ($r = 0.4$, 95%CI 0.15-0.60).

No correlations were found between the hyperaemic response and the explored maternal biophysical markers.

Conclusions. There is a positive correlation between maternal first trimester skin microvascular reactivity indexes and serum placental biomarkers levels, in particular PLGF. Our findings suggest that first trimester skin microvascular reactivity, assessed by LSCI coupled with PORH, could serve as early marker for placental function.