

Maternal ophthalmic artery Doppler in the first and second trimesters of pregnancy for pre-eclampsia prediction

Da Silva Costa F, Alves JA, Praciano PC, Maia SB S, Kane SC, Martins WP
Royal Women's Hospital and Department of Obstetrics and Gynaecology, University of Melbourne, Melbourne, Australia and State University of Ceara, Fortaleza, Brazil

Aim

To determine the performance of a multiparametric test comprising maternal risk factors, uterine artery Doppler and ophthalmic artery Doppler in the first and second trimester of pregnancy for the prediction of pre-eclampsia (PE).

Methods

We carried out two prospective observational cohort studies recruited patients in the first (11-13+6 weeks) and second (18-22 weeks) trimesters of pregnancy. Maternal uterine artery and ophthalmic artery Doppler assessments were performed in 440 singleton pregnancies at 11-13+6 weeks and 415 at 18-22 weeks of gestation. Additional history was obtained through participant questionnaires, and follow-up occurred to discharge post delivery. The normotensive and pre-eclamptic groups were compared using parametric (Student's t-test) and non-parametric (Mann-Whitney U-test) tests. Univariable and multivariable logistic regression analyses were performed to determine which biophysical factors, and which of the factors among the maternal characteristics and medical and obstetric history, had a significant contribution to the prediction of PE in a multiparametric model.

Results

First trimester: there were statistically significant difference ophthalmic artery first diastolic peak (PD1) mean values between the PE and control groups. In a multiparametric model, both UtA-PI and PD1 achieved a 67% detection rate for early PE, although when combined, the detection rate only increased to 68%. Second trimester: a comparison of the ophthalmic artery Doppler parameters between the PE and control groups didn't showed statistically significant differences. The AUC increased from 0.70 to 0.71 when the ophthalmic artery peak ratio (PR) was incorporated into a prediction model based on clinical variables, MAP and UtA-PI.

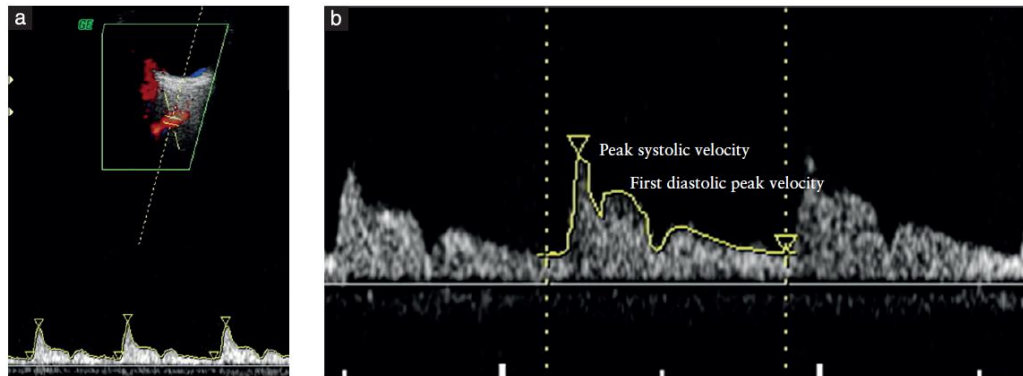


Figure 1 Ophthalmic artery Doppler interrogation (a) and waveform (b).

Conclusion

The efficiency of maternal ophthalmic artery in the first and second trimesters as a predictive marker for the later development of PE was very modest. Although these findings do not support the addition of ophthalmic artery Doppler analysis in multiparametric predictive models for PE, they do provide novel insights into maternal systemic vascular changes that precede the clinical development of this condition.