A potential role of circulating LHCGR forms for the prediction of preeclampsia in the first trimester of pregnancy

Crovetto F, Figueras F, Crispi F, Triunfo S, Pugia M, Lasalvia L, Chambers AE, Millis WE, Banerjee S, Mercadé I, Casals E, Gratacos E
Barcelona Center for Maternal-Fetal and Neonatal Medicine, Barcelona, Spain

Objective

To explore the possible role of circulating human chorionic gonadotrophin receptor (LHCGR) forms in the prediction of early and late preeclampsia (PE) in the first trimester of pregnancy, combined with maternal baseline risk, biophysical parameters and angiogenic factors.

Methods

A case-control study, within a cohort of 5, 759 pregnancies including 20 cases of early PE, 20 of late PE (cut-off: 34 weeks at delivery), 300 controls. Maternal characteristics, mean arterial pressure (MAP), uterine artery (UtA) Doppler (11-13 weeks), placental growth factor (PlGF), soluble Fms-like tyrosine kinase-1 (sFtl-1), circulating sLHCGR, and hCG-LHCGR complexes (8-11 weeks) were measured/recorded. LHCGR difference (LHCGR-D) was calculated by subtracting hCG-LHCGR value from the corresponding sLHCGR. All parameters were normalized by logarithmic transformation, converted in MoM, and logistic regression analysis was used to predict PE.

Results

For the prediction of early PE, significant contributions were provided by black ethnicity, chronic hypertension, previous PE, MAP, UtA Doppler, PlGF, sFlt-1, and LHCGR forms. A model including these predictors together with LHCGR-D, achieved detection rates (DR) of 100% for 5% false positive rates (FPR) (AUC: 0. 995 [95%CI: 0. 988-0. 999]). For late PE, significant contributions were provided by body mass index, previous PE, UtA Doppler, PlGF, sFlt-1, and LHCGR forms. The model including these factors together with LHCGR-D achieved DR of 85% at 5% of FPR (AUC: 0. 961 [95%CI: 0. 928-0. 995]).

Conclusion

Among LHCGR forms, the LHCGR-D improves substantially the prediction for early and late PE in first trimester, if used in algorithms. These new biomarkers seemed useful if used in combination (LHCGR-D) in the context of prediction of PE.