Maternal plasma nerve growth factor at 11 to 13 weeks as a novel angiogenic marker of pre-eclampsia

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Objective
To investigate the potential role of plasma nerve growth factor (NGF) in screening for pre-eclampsia (PE) at 11+0 to 13+6 weeks of gestation.

Methods
This case control study was part of a prospective first trimester screening program for aneuploidies and PE. Before ultrasound all patients completed a demographic questionnaire and a blood test was collected and stored at -80°C for future analysis. Lowest-, highest- and mean-uterine artery Doppler (UtAD) pulsatility index (PI) were obtained with a vaginal probe. The concentration of plasma NGF was determined in samples of 47 patients that subsequently developed PE and 97 controls. Fifty two samples (20 PE and 32 controls) were eliminated from analysis because of undetectable NGF concentration. Multivariate regression analysis was performed for NGF and uterine artery Doppler pulsatility index (UtAD PI) adjustment and expressed as log10 MoM of the unaffected group. Logistic regression analysis was carried out to identify factors with the best prediction for PE. A ROC curve was constructed and a p-value less than .05 was considered as significant. This study was approved by local Ethics Committee.

Results
Crude NGF values were lower in global PE and e-PE groups than controls (91.3 pg/ml, 53.8 pg/ml and 115.8 pg/ml, respectively; p=NS). The significant independent contribution for log10 NGF was crown-to-rump length. The median adjusted log10 MoM NGF in global PE, e-PE and controls was 1.33 (0.52 – 2.82), 0.57 (0.15 – 2.71) and 1.19 (0.36 – 2.19), respectively (p=NS). The most significant contributions for prediction of PE were provided by maternal history (previous PE [OR=13] and chronic hypertension [OR=12]) and biophysical markers (lowest-UtAD PI MoM [OR=1.8]). With a false positive rate of 10%, the detection rate of global PE and e-PE was 40.7% to 50%, respectively.

Conclusion
The first trimester plasma NGF concentration appears to be decreased in patients that developed e-PE. However, the contribution in prediction of PE need further analysis. This new angiogenic marker needs to be tested with larger populations. Funded by OAIC 602/13 and FONDECYT N°1130668.

Figure. First trimester maternal level MoM NGF in early & late PE compared to control group.