A study of the first and second trimester screening of preeclampsia and gestational hypertension

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Objective

We retrospectively explored the possibility of improving the biochemical screening in preeclampsia (PE) by combining the second trimester values of placental growth factor (PlGF). We also aim to elucidate the relationship of decreased PlGF to risk of PE in patients with gestational hypertension.

Methods

PlGF was examined in 70 patients with clinicaly confirmed PE cases, this included 33 samples obtained at the first and second trimester. The first and second trimester screening samples from 2006-2013 were frozen between weeks 12-17 of pregnancy. PAPP-A and free β-hCG were examined on Kryptor platform with kits (Brahms) and evaluated with LifeCycle (Perkin Elmer). PlGF in thawed samples was examined on Delfia Xpress platform (Perkin Elmer) and evaluated with LifeCycle and Preeclampsia Predictor (Perkin Elmer). Increased PE risk in in second trimester was characterized by PlGF levels lower than percentile 3 and 5 on the based on the levels form the control population (obtained between weeks 9-19). The average age of women with early, intermediate and late PE were 37. 8, 30. 7, 30. 9, respectivelly. Gestation hypertension cases included 78 samples. All women were caucasian with an average age of 31. 9 (32. 1 for first and 31. 8 for second trimester).

Results

When evaluated in the first and second trimester, increased risk for early PE was detected in 12/17 (66. 7 % women), 11/15 (73. 3 %) and 6/10 (60. 0 %) for intermediate and late PE, respectively. Altogether, this represents a detection rate of 60. 0 %. Cases examined only in the first trimester, detected 6/9 (66. 7 %), 5/12 (41. 7 %) and 5/11 (45. 5 %) for early, intermediate and late PE, respectively, detecting 50. 0 % of all PE. Cases examined only in the third trimester detected 1/1, 3/3 and 0/0 of early, intermediate and late PE. That false negative results in the first trimester were corrected by second trimester examinations in 3 out of 42 cases (7, 1 %). These data documents that the efficiency of PlGF examination is on the same level as in the first trimester (Akolekar et al. 2013, Fetal Diagn Ther 33: 8-15). The average MoM level for early PE in the first and second trimesters are 0. 72 and 0. 5 respectively, for intermediate 0. 59 and 0. 67, for late 0. 62 and 0. 63. The MoM levels are closely associated with evaluation by PlGF level below the 5th percentile. In gestation hypertension, studied in the first trimester (28), no decreased PlGF levels was found. Second trimester group included 50 women, after elimination of twin pregnancies, only one case with decreased levels of PlGF was found (1/45, 2. 2 %). These results confirm high negative predictive value of PlGF in PE screening. Moreover, it improves the detection rates for ladies with gestation hypertension in second and third trimesters, despite normal values within week 9 to 19 of gestation.

Conclusion

The efficiency of PlGF in PE screening is the same in second trimester as in the first. Combination of the first and second trimester PlGF examination increase the reliability of the first trimester screening and corrects the false negative of Ist trimester screening. The negative predictive value of first trimester PlGF screening is confirmed by PlGF levels lower than 5th percentile disclosed only in one case out of the 71 cases with gestation hypertension. Supported by FN Motol (00064203, Modern therapy), IGA NT13770 and OPPK CZ. 2. 16/3. 1. 00/24022.