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Examination of possible effects of maternal age, maternal weight, pregnancy-associated plasma protein-A, free beta-human chorionic gonadotropin and fetal gender on cell-free fetal DNA percentage in non-invasive prenatal testing screening of Iranian pregnant women

Milad Dolatkhah

Shahid Beheshti University of Medical Sciences, Iran

Nowadays, Cell-Free Fetal DNA (cffDNA) testing as a leading and novel screening method for evaluation of chromosomal aneuploidies has been proposed. Unlike the high sensitivity and specificity of this method, many publications have reported that some potential variables can cause fluctuations in cffDNA percentage of maternal plasma in Non-Invasive Prenatal Testing (NIPT). The aim of this study is to examine the possible effects of maternal age, maternal weight, serum Pregnancy-Associated Plasma Protein-A (PAPP-A) and Free Beta-Human Chorionic Gonadotropin (Free β-hCG) and fetal genders on cffDNA percentage fluctuations. 308 singleton pregnancies of women aged from 20 to 47 years at 11+0 to 13+6 weeks of pregnancy referred to DeNA laboratory (Tehran-Iran) for NIPT test were selected randomly. The cffDNA was extracted from maternal plasma. Whole exome sequencing by ion semiconductor sequencer using cffDNA was applied for all participants. Biochemistry biomarkers from maternal sera were assessed by a fully automated chemiluminescence immunoassay system, Maglumi 4000 (Snibe Company, China). The multiple of medians (MoMs) for PAPP-A and free β-hCG were obtained by a previously available database. The distribution of the maternal age, maternal weight, cffDNA percentage and biochemistry biomarkers were assessed to define the normality of the distribution. The bivariate correlations and regression between cffDNA percentage, maternal age, maternal weight, PAPP-A and free β-hCG were assessed and the mean of cffDNA percentages between male and female fetal genders was compared. The present study showed that cffDNA percentage has no significant correlation with maternal age whilst the cffDNA percentage has a significant correlation with maternal weight, free β-hCG, and PAPP-A. Linear regression between cffDNA percentage and maternal weight, free β-hCG and PAPP-A is significant. The mean of cffDNA percentage between male and female fetal group showed a significant difference. The cffDNA decreased with increasing the maternal weight and increased with increasing serum PAPP-A and serum free β-hCG. The percentages of cffDNA in male fetuses are higher than female fetuses. The cffDNA percentage in the first trimester of pregnancy was affected by maternal age, free β-hCG and PAPP-A. Also, the cffDNA percentage of male fetuses is higher than female fetuses.

Biography

Milad Dolatkhah has completed his PhD from Shahid Beheshti University of Medical Sciences and Health Services. He is currently working as a Manager of QC, QA and R&D in Department of Padina Vista holding company.

dr.miladdolatkhah@gmail.com