Objective

Uterine artery Doppler studies with measurement of pulsatility index (UtPI) represent recognized predictors of placental insufficiency and preeclampsia. Mode of conception (MC) has not been shown to modify the PI of uterine arteries; however we are not aware of studies investigating egg donations (ED). We hypothesize that perfusion of uterine arteries evaluated with Doppler studies may be different in pregnancies conceived after ED and we tested this hypothesis in an exploratory case-control trial.

Methods

Prospective study of 205 pregnant women with different MC: 40 ED, 125 spontaneous conceptions (SC) and 40 autologous intra-cytoplasmatic sperm injections (ICSI). Left and right UtPI were measured during the combined screening test at 11-14 weeks by certified operators following the Fetal Medicine Foundation guidelines. Mean UtPI was calculated and used for analysis. The Mann-Whitney test was used to compare the statistical significance of differences in the distribution of UtPI according to MC (ICSI and ED were compared with reference category of SC). In order to evaluate the effect of different MC on UtPI, multivariable linear regression models predicting UtPI were fitted. Predictors consisted of MC, maternal or oocyte age (defined as maternal age for spontaneous and ICSI groups and as donor age for egg donation group), body mass index (BMI), parity, gestational diabetes, smoking status. Prevalence of preeclampsia was recorded.

Results

Median maternal age was 33 years (interquartile range [IQR] 29-35) for SC (reference group), 37 years (IQR 34-39) for ICSI (p<0.001) and 44 years (IQR 40-47) for ED (p<0.001). Median oocyte age was 24 (IQR 21-27) years in ED. No significant differences were recorded with respect to all other variables (all p>0.05). The median UtPI was 1.65 (IQR 1.32-2.05) for SC, 1.58 (IQR 1.26-1.94) for ICSI (p=0.6) and 1.21 (IQR 0.99-1.71) for ED (p<0.001). After adjustment for maternal age, BMI, parity, gestational diabetes and smoking status, ICSI was not associated with a different UtPI compared to SC (estimate [Est] 0.01; 95% confidence intervals [CI] -0.19, 0.21; p=0.9). Conversely, after adjustment for the same potential confounders, ED remained associated with a significantly lower UtPI (Est -0.34; CI -0.57, -0.10 p<0.001). When oocyte age instead of maternal age was included in the model, similar results were recorded. Neither maternal (Est 0.004; CI -0.01, 0.02; p=0.6) nor oocyte age (Est -0.001; -0.02, 0.01; p=0.9) were associated with UtPI. Prevalence of preeclampsia was not statistically different in the three groups (ED: 2 cases; ICSI: 1 case; SC: 3 cases; p=0.05).

Conclusion

In our sample ED at 11-14 weeks was associated with an average 20% reduction of mean UtPI as compared to spontaneous conceptions, whereas no significant difference is found comparing ICSI and SC. We believe that this finding may be explained by differences in the endocrine and immunological milieu. Although this original observation was confirmed after adjustment for potential confounders, it needs independent confirmation with larger sample size. Future research needs to evaluate later gestations and needs for adjustments of preeclampsia prediction model in ED.