



Fetal weight gain velocity and type of conception in the prediction of small for gestational age

Albaigés G, Mula R, Serrano, Caner N, Muñoz A, Rodríguez MA, Rodríguez N, Serra B
Hospital Universitario Dexeus. Barcelona, Barcelona, Spain

Objective

The aim of this study was to characterise the fetal weight gain velocity between 20 and 36 weeks and to include this variable in a multparameter model to predict birthweight and detect SGA at term. We also compared this variable according to the type of conception.

Methods

This is a single centre cohort study including pregnancies recruited at 12 weeks gestation. Maternal characteristics included were weight, height, age and smoking status. PAPP-A and beta-hcg MoMs were log converted, uterine artery doppler at 12 weeks was measured. There were three scanning timepoints: 20, 28 and 36 weeks, with calculation of estimated fetal weight (EFW) using the Hadlock 4 formula. The weight gain velocity was calculated as the difference in EFW between two consecutive scanning points divided by the days in the interval: ie. $vEFW_{28-20} = (EFW_{28} - EFW_{20}) / \text{days}$. The type of conception was grouped into: spontaneous, IVF, frozen embryo cryotransfer and egg donation. The means of the different $vEFW$ were compared. Finally a logistic regression model was applied including the different variables and comparing the two $vEFW_{28-20}$ vs $vEFW_{36-28}$. The predicted variable was SGA defined as birthweight below 10th centile according to national charts.

Results

2737 singletons pregnancies were included. 2364 spontaneous (86. 4%) and 373 (13. 6%) assisted reproductive techniques (ART). The mean $vEFW_{28-20}$ was 16. 79 gr/day in the spontaneous group, 16. 56 IVF, 17. 27 Cryotransfer and 16. 73 egg donation (p 0. 02). For the $vEFW_{36-28}$ the results were: spontaneous: 28. 24, IVF 26. 69 Cryotransfer 29. 18 and 28. 09 egg donation (p 0. 001). The IVF group had the lowest weight gain velocities and the cryotransfer group the highest. Two regression models were constructed, with the two different $vEFW$. The first model including the following significant variables: log MoM PAPP-A, log MoM mean uterine artery doppler, height, smoking and $vEFW_{28-20}$. This model had ROC curve with an AUC of 0, 77 (0, 74-0. 79). The model using the $vEFW_{36-28}$ included the same significant variables except for the log MOM PAPP-A, and had an AUC of 0, 84 (0. 82-0. 87). The different types of conception were not significantly different in the prediction model. The detection rate of SGA at term for a 10 % false positive rate was 36 % for the $vEFW_{28-20}$ model and 54% for the $vEFW_{36-28}$ model.

Conclusion

The weight gain velocity included in a multiparametric model of prediction of birthweight allows to detect one out of three SGA babies at 28 weeks. At 36 wks more than 50 % of the SGA will be predicted with the model. The cryotransfer group have the highest weight gain velocity and although it was not significant in the predictive model, it remains to be explained why these fetuses might have a different growth pattern.