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Prediciton of large for gestational age: fetal soft tissue ultrasound measurements

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Objective

The predict large for gestational age (LGA) birth weight by prenatal ultrasound is poor. The aim of this study was to investigate whether fetal soft tissue measurements could improve predictive performance for LGA in comparison to abdominal circumference (AC) and/or estimated fetal weight (EFW) used in current practice in the general pregnant population.

Methods

We conducted a prospective observational study among 325 pregnant individuals visiting the antenatal clinic at Amsterdam UMC for routine third trimester prenatal biometry by ultrasound between January and November 2021. In women with repeated ultrasound measurements, we used the last ultrasound prior to delivery. The Hadlock formula was used to establish a standard calculation of the estimated fetal growth (EFW), using fetal head circumference (HC), biparietal diameter (BPD), AC, and femur length (FL). Offline, assessors blinded to clinical outcome data, performed additional measurements, consisting of fetal abdominal subcutaneous tissue (FAST) or fetal fat layer (FFL), fetal mid-thigh muscle thickness (TM) and fetal mid-thigh subcutaneous tissue (TF) (figure 1 (presented at congresss)). The primary outcome was the prediction of LGA by these soft tissue measurements compared to the actual birthweight. In our study LGA was considered birth weight ≥ p90. Pearson's correlations were calculated to estimate the correlations. The performance of fetal soft tissue measurements to identify LGA at birth were evaluated using receiver-operating characteristics (ROC) curves. Logistic regression models were used to determine whether the predictive value would increase when combining the soft tissue measurements together, and with pBMI.

Results

The mean age of the study population was 32 years (SD=5.1). 11.5% of the newborns was LGA. Baseline characteristics were compared between the LGA and non-LGA group. Prepregnancy Body Mass Index (pBMI) was higher women with LGA infants(26[?]6) compared to the non-LGA group (29[?]7). ROC curves showed that pBMI by itself was a poor predictor for LGA (AUC = 0.636). The additional soft tissue measurements also showed a difference between the two groups; all measurements were significantly higher in the LGA group. Pearson's correlations showed relatively fair positive correlations for the separate measurements of the soft tissue measurements (0.37 for FAST, 0.28 for TF). Conventional measurements showed the strongest correlation (0.72). ROC curves are shown in figure 2. After combining FAST and TF, AUC increased slightly (AUC=0.781). The AUC of the model in which pBMI, FAST and TF were combined AUC increases a bit further (AUC=0.785).

Conclusion

Fetal soft tissue ultrasound measurements do not provide substantial improvements in LGA prediction in comparison to conventional measurements. Our study could not study soft tissue measures in subgroups, e. g. diabetic pregnancy, or on other outcomes including neonatal hypoglycemia.