The validation of the Fetal Medicine Foundation screening algorithm for small-for-gestational-age neonates in Russian population

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Objectives. Combined first trimester screening algorithms provide an opportunity for estimation of patient-specific risks for fetal aneuploidies and for small-for-gestational age (SGA) neonates at the same time using the same serum tests. The aim of this study was to validate the algorithm of screening for preterm SGA delivered before 37 weeks (pSGA) proposed by the Fetal Medicine Foundation (FMF) in a Russian population.

Methods. This was a prospective study on screening for pSGA in 3054 singleton pregnancies by the algorithm that combines maternal factors, mean arterial pressure, maternal serum biochemistry (PAPP-A), and uterine artery pulsatility index at 11-13 weeks' gestation at Fetal Medicine Center (Russia). We excluded 1451 cases because of loss to follow-up (n = 1269), fetal abnormalities (n=159), and miscarriages before 22 weeks (n=23). The definition of SGA was birthweight below the 10th percentile according sex-specific actual-age growth charts for preterm and term infants used in Russian Federation. Risk calculations were performed with Astraia Software 2.8 (GmbH). Statistical analyses were performed using MedCalc Software (Belgium).

Results. In the cohort of 2053 patients screen-positive rate was accounted for 23.38 % (480 cases). 137 (6.67%) neonates were SGA, including 37 (1.8%) cases of pSGA and 100 (4.87%) cases of SGA at term. The use of the screening algorithm for pSGA in Russian population achieved AUC 0.836 (95% CI 0.819 – 0.852) with optimal cut-off ≤162, increased pSGA odds 16.0 (95% CI, 6.97 – 36.67), but high false positive rate of 23.12%.

Conclusions: Since at present more than 80% of Russian women have their first trimester screening with the described FMF algorithm, this information can be useful in customizing antenatal care, justifying the need for growth scans and possible aspirin prophylactic. Progressive implementation of additional biochemical markers, e.g. PLGF and sol FLT, can markedly improve the performance of screening for SGA.