Prediction of stillbirth by fetal biometry, uterine artery doppler and maternal demographic characteristics

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Objective
To evaluate the relative value of mid trimester fetal biometry, uterine artery (UtA) Doppler indices and maternal demographics in prediction of stillbirths.

Methods
Retrospective cohort study in a single tertiary referral center from 2000 to 2014. 23,894 singleton pregnancies routinely scanned between 19 and 24 weeks of gestation. Maternal demographic characteristics included maternal age, body mass index (BMI), ethnicity and medical history. Fetal biometry indices, birth weight (BW) and uterine artery (UtA) PI values were converted to percentiles and multivariable logistic regression analysis was performed. The predictive accuracy was assessed using receiver operating characteristic (ROC) curves analysis. The main outcome measure was second trimester prediction of preterm and term stillbirths.

Results
Non-caucasian ethnicity, femur length (FL) centile and UtA PI were significantly associated with the risk of stillbirth (all p <0.01). The detection rate (DR) of screening by maternal factors alone was 19% for all stillbirths, and 12%, 14% and 12% for stillbirth at term, preterm and very preterm gestations at a 10% false positive rate (FPR). Using FL centile alone the DRs for stillbirth occurring at >37, <37 and <32 weeks of gestation were 27%, 23% and 28%, respectively. UtA PI alone was able to predict 24%, 31% and 40% of term, preterm and very preterm stillbirths, respectively. Screening by combining maternal factors, FL centile and UtA Doppler detected 27%, 35% and 40% of stillbirths occurring at >37, <37 and <32 weeks, respectively at a FPR of 10%.

Conclusion
Second trimester ultrasound assessment presents an opportunity to identify pregnancies at highest risk of stillbirth occurring as a consequence of placental dysfunction.