OP14.02
The influence of maternal age on early first trimester growth assessed by ultrasound

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Objectives: Classical first trimester dating charts were developed on an heterogeneous age group of women. Increasing maternal age (MA) is associated with complications throughout pregnancy. Smaller than expected CRL at the end of the first trimester is associated with low birth weight and smallness for gestational age, which both predict later morbidity and mortality. Our objective was to determine whether MA influences early first trimester growth in apparently normal pregnancies.
Methods: Prospective cohort study of 1828 women attending for initial transvaginal ultrasound before 12w. Inclusion criteria: natural singleton pregnancies, certain dates, confirmed viability at 11–14w with no reported fetal abnormality. Multilinear regression analysis was used to determine whether MA influenced rate of growth of crown rump length (CRL), mean gestation sac diameter (MSD) and mean yolk sac diameter (MYD).
Results: 908 data points were included from gestational age 37–98d. Maternal age significantly influenced the change in CRL with the expected value for CRL at any GA differing significantly between 2 women who differ 1y in age ($P < 0.0001$). The correlation was present throughout the first trimester with older women having fetuses with larger CRL. This was equivalent to a difference in CRL of 2.06 mm between two women of 20 and 40 years at 6w and a difference of 4.14 mm at 12w. The correlation remained after correction for bleeding, parity and ethnicity. Older women also had fetuses with larger MSD. CRL/MSD ratio and MYD were not related to MA.
Conclusions: Embryonic growth is significantly influenced by MA. Increasing numbers of pregnancies occur in older women and traditional charts (Robinson/Hadlock) do not take into account MA variation. Our data suggest that customized first trimester charts should be considered. The relationship between adverse outcomes in women of advancing MA and the demonstrated age related variation in very early growth needs further investigation.

OP14.03
Antenatal diagnosis of fetal growth restriction - is there an ideal method?

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Objectives: Ultrasound identification of fetal growth trajectory for the diagnosis and management of fetal growth restriction (FGR) compared to the customized birth weight centile charts and birth weight < 2.5 kg.
Methods: A prospective, cohort study of healthy pregnant women recruited from a teaching hospital. All subjects underwent 2nd trimester anomaly scan 18–22 week gestation. Two further scans were offered in late 2nd and 3rd trimester (28 ± 2 weeks gestation and 36 ± 2 weeks gestation, respectively) to identify FGR. The expected date of delivery was calculated based on early ultrasound and all measurements were performed with using a 4.3 mHz curvilinear abdominal probe.
Fetal biometry measurements were plotted on the graphs based on the British Medical Ultrasound Society. Fetal growth was assessed by serial ultrasound growth trajectory. Birth weight centiles were calculated using computer software provided by the Perinatal Institute Birmingham (www.gestation.net). This centile calculator customized for maternal height, maternal weight, ethnicity, parity, gestation at delivery, sex and weight of the baby.
Results: Six hundred women were recruited and the mean birth weight was 3.54 kg (Range-1.38/3.88 kg). Of these 72 (12%) had FGR (< 10th centile) based on the customized centile charts. Sixty three (10.5%) showed FGR based on the ultrasound growth trajectory whereas only 18 (3%) were FGR based on the traditional definition of < 2.5 kg birth weight. 77% of growth restricted fetuses were identified by both ultrasound and customized centile charts.
Conclusions: Our study showed that antenatal diagnosis and management for FGR is better performed by ultrasound assessment of fetal growth trajectory. The traditional definition based on < 2.5 kg is not applicable in view of the current environmental and genetic factors. The customized centile charts are accurate for the post- natal identification of growth restriction and management in future pregnancy.

OP14.04
Prediction of small for gestational age fetuses with combination of the maternal serological markers PAPP-A, beta-hCG and ADAM12 in first trimester

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Objectives: To examine the ability of predicting fetuses being small for gestational age (SGA) with the maternal serological markers PAPP-A, beta-hCG and ADAM12 in first trimester.
Methods: From a one-year cohort (2005/2006) of 1,734 women consecutively enrolled into the combined first trimester screening program for Down syndrome (PAPP-A, beta-hCG and nuchal translucency) 36 cases being SGA (birth weight < 5th centile) and 108 controls not being SGA were matched on ethnicity (only Caucasians), smoking status (only non-smokers), body-mass index, age and parity. Stored blood samples (double tests) were analyzed for ADAM12. Median MoM values in cases and controls were compared using Mann-Whitney test. Monte Carlo estimation and receiver-operator-characteristics curves were used to asses screening performance.
Results: Median MoM values were significantly reduced in cases compared to controls for all three markers. Respectively, PAPP-A (0.62, 1.12, $P < 0.001$), beta-hCG (0.74, 1.04, $P = 0.007$) and ADAM12 (0.79, 0.98, $P = 0.023$). Using the combination of all three markers a detection rate of 39% for SGA was found, with a false-positive rate of 9% and a risk cut-off of 1:9. Lowering the false-positive rate to 5% a detection rate of 28% and a risk cut-off of 1:6 were found.
Conclusions: Early prediction of fetuses being SGA is feasible with the combination of first trimester maternal PAPP-A, beta-hCG and ADAM12. Screening performance could probably be improved with addition of further ultrasound and biochemical markers.