

P20.02**The relationship between abdominal circumference and middle cerebral artery Doppler z-scores in severe early onset fetal growth restriction**

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Introduction: Although the association between abnormal middle cerebral artery (MCA) Doppler and fetal growth restriction is well established, its nature remains undefined. We sought to establish the relationship between MCA Doppler pulsatility index (PI) and abdominal circumference (AC) in babies with severe early onset fetal growth restriction.

Methods: Cases with estimated fetal weight < 500 g and abnormal umbilical artery Doppler at 24 weeks were included. Serial MCA Doppler and abdominal circumference measurements were performed to delivery. These measurements were expressed as z-scores and analyzed using functional linear discriminatory analysis (FLDA). The longitudinal curve was converted into a correlation coefficient expressing the relationship between the measurements.

Results: 12 women were studied, comprising 51 scans. There was a positive correlation between MCA z-score and AC z-score (Spearman correlation coefficient = 0.991; $p < 0.0001$).

Conclusions: We describe a new technique for longitudinal analysis to demonstrate the relationship between MCA Doppler and the degree of fetal growth restriction as assessed by z-scores, rendering the data gestation independent. The smaller the AC z-score, the lower the MCA PI z-score, a finding consistent with cerebral blood flow redistribution that occurs with progressive hypoxia and growth restriction.

Supporting information can be found in the online version of this abstract.

P20.03**Clinical progression to stillbirth in fetal growth restriction**

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Objective: Determine the natural history of stillbirth (SB) in fetal growth restriction (FGR)

Study Design: prospective multi-center study of FGR monitored with umbilical (UA), middle cerebral artery (MCA), ductus venosus (DV) Doppler and biophysical profile (BPP). Trends for surveillance test results were related to SB.

Results: 45 of 669 patients (7.3%) with 2731 surveillance tests had SB which occurred in two gestational age clusters (figure). Before 34 weeks SB (n = 34) followed more severe placental disease progressing from UA to DV and BPP abnormality. SBs > 34 weeks

(n = 11) occurred following new-onset brain sparing and nonreactive (nr) NST ($p < 0.0005$ and 0.05).

Conclusion: FGR presents in two distinct patterns. Early onset FGR features marked umbilical artery abnormality with progression to venous Doppler changes, for stillbirth prevention monitoring intervals are based on venous Doppler and delivery on biophysical profile. In late FGR, Doppler abnormalities are more subtle. Given that venous Doppler abnormalities do not occur, different indicators for monitoring intervals need to be defined. Abrupt changes in MCA parameters may require heightened surveillance.

Supporting information can be found in the online version of this abstract.

P20.04**Three-dimensional (3D) power Doppler ultrasound blood flow indices in the assessment of placental, renal and cerebral perfusion in growth restricted fetuses**

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Objectives: To investigate three-dimensional (3D) power Doppler ultrasound blood flow indices in the assessment of placental, renal and cerebral perfusion and their relationship to gestational age (GA), umbilical artery, middle cerebral artery and renal artery Doppler flow velocity waveform (FVW) patterns in normal and growth-restricted (GR) fetuses. Cerebral perfusion indices were also correlated with computerised CTG analysis (Omniview-Sisporto® 3.5 Speculum, Portugal).

Methods: Twenty-three pregnant women at 24–32 weeks' gestation were studied, of whom 7 had GR and 16 were controls. All cases in the GR group had abnormal umbilical FVWs, two had absent end-diastolic velocities (AED) and one had reversed end-diastolic velocities (RED). 3D power Doppler indices related to placental perfusion were obtained by sampling the area around the insertion of the umbilical cord. To decrease the effect of the maternal body index and fetus position all indices calculated (vascularization index (VI), vascularization flow index (VFI) and flow index (FI)) were expressed as a percentage of those obtained by sampling fetal aorta. T-test was used as statistical method and significance was considered when $p < 0.05$.

Results: Placental and renal VI was significantly lower in GR fetuses compared with controls ($P = 0.002$; $P = 0.02$), while cerebral FI was increased in this group compared with controls. Percentage of short-term variability < 1 bpm was significantly decreased in GR fetuses ($p = 0.03$), but was not correlated with cerebral vascularization and flow indices.

Conclusions: 3D power Doppler blood flow indices may be used to corroborate umbilical and renal artery Doppler studies in GR fetuses. Cerebral indices do not seem to be related with short-term variability assessed by computerized CTG analysis.

P20.05**The nucleated red blood cell counts in the cord blood with intrauterine growth restriction in term pregnancy**

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Objective: To determine the relationship between nucleated red blood cell in the umbilical cord (nRBC) and Doppler wave form velocity with intrauterine growth restriction (IUGR) in term pregnancy

Methods: Total 93 cases were enrolled and were categorized according to S/D ratio of umbilical artery. Patients were classified as normal pregnancy (n = 22), normal S/D ratio group (n = 60),