

OC02.07

**Association between frontal tissue perfusion and neonatal neurobehavior in full-term small-for-gestational-age fetuses**

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**Objective:** To evaluate changes in frontal tissue perfusion and middle cerebral artery Doppler in term small-for-gestational-age fetuses (SGA) and to explore their association with neonatal neurobehaviour.

**Methods:** Frontal tissue perfusion measured by Fractional Moving Blood Volume (FMBV) and middle cerebral artery Doppler (MCA) pulsatility index (PI) were assessed in 60 SGA fetuses with normal umbilical artery Doppler, matched with 60 adequate-for-gestational age fetuses. The neonatal neurobehavior was evaluated by the Brazelton test. The association between FMBV, MCA PI and NBAS was analyzed by multiple logistic regression.

**Results:** SGA fetuses showed significantly higher proportion of increased frontal tissue perfusion ( $p < 0.05$ ) (35% vs. 5%,  $p < 0.001$ ) and MCA vasodilatation ( $p < 0.05$ ) (15% vs. 1.7%,  $p < 0.01$ ) than controls. SGA neonates showed lower neurobehavioral scores in all areas. While MCA vasodilatation identified cases with abnormal scores in motor area (OR 9), increased frontal perfusion identified SGA fetuses with the highest risks of abnormal scores in social-interactive (odds ratio (OR) 7.1), attention (OR 19.6) and state-organization (OR 18.5).

**Conclusion:** Increased frontal tissue perfusion discriminates SGA fetuses at risk for abnormal neurobehavior with a much higher accuracy than Doppler of the MCA.

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Frequency of abnormal neonatal neurobehavioral performance among the study groups