EVALUATION OF FETAL CORPUS-CALLOSUM AS A BIOMARKER OF ALTERED BRAIN-PROGRAMMING IN HYPERGLYCEMIA-IN-PREGNANCY

Nuruddin Mohammed[1], R Nuruddin[2], M Yawar Yakoob[3], S Khan[4], S Jabbar[5]
[1]*Obstetrics and Gynaecology, Aga Khan University, Pakistan*
[2]*Community Health Sciences, Aga Khan University, Pakistan*
[3]*Medicine, Johns Hopkins University, USA*
[4]*Obstetrics and Gynaecology, Aga Khan University, Pakistan*
[5]*Obstetrics and Gynaecology, Aga Khan University, Pakistan*

Introduction: Fetal brain-reorganization in hyperglycemia-in-pregnancy (HIP) could possibly be detected by neuroimaging of Corpus-Callosum (CC) due to its extensive interconnectivity within brain. **Objective:** To assess the difference in fetal CC length and area between HIP and euglycemic pregnancies (EP). **Methods:** We identified 54 HIP and 95 EP based on HbA1c and oral-glucose-tolerance-test (2015-16). Outer-outer (O-O), inner-inner (I-I) CC lengths (mm) and area (mm^2) were measured using two-dimensional-trans-abdominal neuro-imaging in mid-sagittal-plane in third-trimester. **Results:** The mean gestational age (GA) at ultrasonography was similar for HIP and EP (33.5 vs. 33.2 weeks; P=0.57). After adjustment for GA at scan, gender, cephalic-index (CI), maternal-body-mass-index (BMI) and age, mean I-I CC length was 1.3 mm lower (95% CI: -2.5, -0.09; P=0.03) and mean CC area was 22.0 mm^2 lower in HIP-fetuses, (-35.1 to -9.0; P0.01) compared to EP fetuses with no significant difference in O-O CC length (-0.59, -1.9 to 0.70; P=0.37). In sub-group analyses, essential-diabetes (ED) was associated with significantly lower I-I, O-O CC lengths and areas compared to EP. Gestational-Diabetes (GD) was only associated with lower area with a smaller magnitude than for ED. GA at scan was another significant predictor with an increase of 0.75 mm O-O, 0.48 mm I-I and 2.1 mm^2 area per GA week increase. **Conclusion:** HIP is associated with reduced I-I CC length and area, driven largely by ED. This may potentially indicate adaptive fetal brain-reorganization in response to compromised intra-uterine-environment. Association between inadequate CC growth among HIP fetuses and neuro-cognitive impairment in early-childhood needs further evaluation.