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TITLE: Persistent alteration in myocardial deformation and cardiac geometry and function in growth restricted and diabetic pregnancies from term fetus to neonate

AUTHORS (FIRST NAME, LAST NAME): Olga Patey^{1, 2}, Julene S. Carvalho^{2, 3}, Basky Thilaganathan^{1, 3}

INSTITUTIONS (ALL):

1. St George's Hospital Medical School, University of London, London, United Kingdom.
2. Brompton Centre for Fetal Cardiology, Royal Brompton Hospital, London, United Kingdom.
3. Fetal Medicine Unit, St George's Hospital, London, United Kingdom.

ABSTRACT BODY:

Objectives: To evaluate fetal and neonatal ventricular geometry, myocardial deformation and cardiac function in normal, small for gestational age (SGA), and gestational diabetes (GDM) pregnancies at term.

Methods: Prospective study of 107 pregnant women at term included three patient groups: normally grown (n=54), SGA (n=33) and GDM fetuses (n=20). Conventional echo, spectral tissue Doppler and 2D speckle tracking imaging (STI) assessing ventricular geometry, all aspects of myocardial deformation and systolic/diastolic function were performed few days before the onset of labor and within hours of birth. All cardiac indices were normalized by ventricular length.

Results: Compared to the normal group, SGA and GDM fetuses demonstrated a significant ($p < 0.001$ for all) alteration in *ventricular geometry* (RV sphericity index: 1.85 vs. 1.68 vs. 1.51; LV sphericity index: 2.05 vs. 1.87 vs. 1.90, respectively) with corresponding differences in *myocardial deformation* (LV longitudinal strain rate: -1.9 /s vs. -1.8 /s vs. -2.1 /s; LV basal circumferential strain rate: -2.4 /s vs. -2.0 /s vs. -3.0 /s; LV basal radial strain rate: 2.2 /s vs. 1.9 /s vs. 2.6 /s; LV torsion: 2.5 deg/cm vs. 1.9 deg/cm vs. 4.7 deg/cm, respectively) as well as *cardiac function* (RV S': 5.8 cm/s vs. 6.0 cm/s vs. 7.0 cm/s; IVS E'/A': 0.71 vs. 0.60 vs. 0.60, respectively). All echo indices remained significantly altered in SGA and GDM newborns compared to normal neonates.

Conclusions: Term SGA and GDM fetuses exhibit altered cardiac indices indicative of myocardial and chamber dysfunction as a consequence of an adverse intrauterine environment with evidence of persistence of geometric and functional alterations in cardiac parameters after birth.

Additional details

KEYWORDS: Fetal cardiac function, Echocardiography, Diabetes, Intrauterine growth restriction.

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