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Differences between echocardiographic features of newborns large for gestational age , newborns of mothers with gestational diabetes and newborns appropriate for gestational age

*Erolu E.(1), Akalin F.(2), Karacan M.(1), Sahin O.(1), Bilgin L.(1)
Umraniye Education and Research Hospital Istanbul, Turkey (1)Marmara University Istanbul, Turkey (2)*

Introduction:

We studied echocardiographic features of asymptomatic newborns of mothers with gestational diabetes (GDM), newborns large for gestational age (LGA) and newborns appropriate for gestational age (AGA).

Methods: The study involved 60 singleton full-term newborn babies on whom echocardiogram were performed within the 24th- 72th hours after delivery. None of the patients had perinatal asphyxia. None of patients had congenital heart disease or metabolic disturbance. There were 20 LGA , 20 newborns of mothers with GDM and 20 AGA. Five of the diabetic mothers used insulin during pregnancy. MMod measurements of left ventricle, left atrium and systolic and diastolic diameters of ascending aorta (Asc Ao) were obtained with 2D Echocardiography (Philips Medical Systems Affiniti 50) equipped with Neonatal Sector S12-4; systolic functions were calculated from MMod. Mitral inflow parameters were measured by Pulse Wave Doppler echocardiography for assesment of left ventricular diastolic functions. Tissue doppler echocardiography was performed, MPI index was calculated.

Results: Left ventricular diastolic diameter (LVDd), left ventricular posterior wall diameter (LVPWd) and left atrial diameter (LAD) were higher in LGA group than AGA group ($p=0.017$, $p=0.020$; respectively). Aortic diameter and diameter of ascending aorta at diastole were higher in LGA than AGA group ($p=0.001$, $p=0.039$; respectively). In comparison of AGA and newborn of GDM, no statistical difference was obtained between echocardiographic parameters of two groups. LAD was larger in newborns of GDM in comparison of AGA and newborn of diabetic mothers groups ($p=0.0008$). There was no correlation between body surface area, height, weight and left atrial and left ventricular dimensions in LGA group.

Conclusions: Fetal macrosomia is associated with cardiac hypertrophy and fetal hypoxia, even intrauterine death. Cardiac biomarkers were found to be increased in LGA newborns compared to AGA newborns in a previous study. Enlargement of left heart chambers in LGA in our study might be a consequence of this finding. Although we did not study elasticity parameters of aorta, the difference in diameters in aorta and Asc Ao might be related to aortic elasticity properties of these infants. Low insulin usage might explain the indifference in myocardial functions in GDM group.