

### Impact of Gestational Diabetes Mellitus on Fetal Cardiac Morphology and Performance

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#### Purpose:

Fetal echocardiogram is indicated in several reasons like family history of congenital heart disease (CHD), maternal illness, abnormalities determined during fetal screening, etc. Gestational diabetes (GD) is an important maternal cause of fetal cardiac morphological and functional deterioration. In this respect, our aim was to evaluate the impact of GD on fetal cardiovascular system.

#### Methods:

146 women (56 of GD and 90 healthy subjects) at gestational ages between 17 and 32, underwent fetal echocardiographic evaluation in our institution from 2008 to 2011 were recruited a prospective cross sectional case control study. Diagnosis of GD was based on fasting serum glucose and oral glucose tolerance test. Fetal cardiovascular morphology, systolic and diastolic functions were assessed by 2D, M – Mode and Doppler echocardiography.

#### Results:

Gestational diabetic pregnant (GDPs) were significantly obese (71,4%, BMI> 25, p=0,003) and their HbA1c levels were higher than control group (p<0.001). The frequency of fetuses with CHD was 9,5% where 10% in patient group and 8,9% in healthy subjects. The major cardiac malformation was VSD (2%). Systolic left ventricular free wall and septal thickness, aortic and pulmonary peak systolic velocities were significantly higher in fetuses of GDPs (43,49±11,21 mm, p=0,001; 34,66±7,12 mm, p=0,002; 88,05±15,38 cm/sec, p=0,006; 64,17±8,34 cm/sec, p=0,007 respectively). Mean ejection fraction (EF) of GDPs fetuses were 77,88±10,87% and 78,43±8,08 (p=0,744), however fractional shortening (FS) was found increased in GDPs' fetuses (44,47±10,05; p=0,048). GDPs fetuses tricuspid mean early/atrial velocity ratio (E/A) was 0,72±0,06 and mitral E/A was 0,79±0,09, which wasn't different from healthy pregnant fetuses (p>0.05). Mean myocardial performance indexes of left and right ventricles were 0.28 and 0.210, where they were 0.30 and 0.31 in the control group (p= 0,088 and 0,069 respectively).

#### Conclusions:

High frequencies of structural abnormalities was thought of our institution being a tertiary center. Higher velocities in great vessels, increase in left ventricular wall thickness and diastolic dysfunction of both ventricle were supporting previous publications. Increased FS while the EF remaining similar when compared with healthy pregnant fetuses were different from the previous reports. These findings suggested that there may be a global geometric distortion in ventricular contraction of the affected fetal myocardium