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Introduction

To evaluate of ventricular diastolic function by tissue doppler in fetuses of diabetic mothers and compare with healthy control groups.

Methods

Between November 2009, May 2011 38 mother with gestational diabetes mellitus and 75 healthy control subjects were recruited prospectively to have fetal echocardiogram at 24, 28, 32 and 36 weeks of gestation to assess cardiac diastolic function and interventricular septum thickness. Diastolic function was evaluated by using tissue Doppler and pulse wave Doppler. Haemoglobin glycosylated (HbA1c) levels were obtained at 24 gestational week. Early (Ea) and late diastolic (Aa) peak tissue Doppler imaging at the base of right ventricular free wall, ventricular septum, left ventricular free wall and both atrioventricular valves early (E), late (A) inflow velocities were analyzed in 91 fetuses and compared between groups. General linear model repeated measure was used as a statistical analysis.

Results

In both groups fetal interventricular septum thickness increased progressively with advancing gestation. Fetal interventricular septum were significantly thicker in the presence of gestational diabetes mellitus ($p < 0.001$). Mean levels of HbA1c were $5,78 \pm 0.73$ % in gestational diabetic mothers, 5.01 ± 0.37 % in control group ($p < 0.003$). HbA1c was significantly higher in the gestational diabetic mothers. E, A, Ea, Aa, Ea/Aa and E/A ratios increased with gestational age at all sites in both group. Peak velocities of mitral E ($p < 0.001$), mitral A (0,007), tricuspid E (< 0.001) and tricuspid A (0.002) were significantly higher in the presence of gestational diabetes mellitus. Ratios of E/A and Ea/Aa progressively increased in both group. Mitral E/A and tricuspid E/A of fetuses of diabetic mother were lower in third trimester. Ea:Aa ratio of right ventricle was higher in fetuses of mothers with gestational diabetes mellitus advancing gestation ($p < 0,03$) (Table).

Table. Comparison of fetal cardiac changes throughout pregnancy

	Control Groups <i>p</i>	Fetuses of diabetic mothers <i>p</i>	Difference between groups <i>p</i>
Mitral E, cm/saniye	<0,001	<0,001	<0,001
Mitral A, cm/saniye	<0,001	<0,001	0,007
Triküspit E, cm/saniye	<0,001	<0,001	<0,001
Triküspit A, cm/saniye	0,001	0,001	0,002
Mitral E/A	<0,001	<0,001	0,002
Triküspit E/A	<0,001	<0,001	0,02
RV Ea/Aa	<0,001	<0,001	0,03
RV Lateral Ea, cm/saniye	<0,001	<0,001	0,02
RV Lateral Aa, cm/saniye	<0,001	<0,001	0,04

Conclusions

Myocardial velocities obtained with TDE in conjunction with traditional Doppler methods provide an important non-invasive means of assessing diastolic function. We think that maternal diabetes mellitus is associated with impaired ventricular diastolic function in the fetus. Impaired ventricular diastolic function seems as a result of decreased relaxation and compliance.