

ULTRASOUND AND DOPPLER IN ASSESSMENT OF EFFECTS OF PREGNANCY ASSOCIATED DIABETES MELLITUS ON FETOPLACENTAL CIRCULATION

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INTRODUCTION

Diabetes mellitus (DM) is one of the most common non-communicable diseases (NCD), with serious consequence on the fetus and the expectant mother. It is classically categorized into pregestational diabetes mellitus or other less common subtypes including gestational diabetes.

Pregnancies complicated by DM are associated with an increased risk of fetal and neonatal risks compared to pregnancies in the healthy gravida. Stillbirth and perinatal mortality may be increased as much as 5 times for patients with insulin-dependent diabetes than in the general population

The rate of significant congenital malformations ranges between 6%-10% among both GDM and PGDM with much higher risk in PGDM than GDM .Fetal congenital malformations can affect virtually every single organ in the fetus; however, two-thirds of the anomalies involve the cardiovascular system (8.5 per 100 live births) or central nervous system.

On the maternal side, morbidity and mortality rates are higher among pregnant women with diabetes. Because of highr incidence of preeclampsia (12.7%), Cesarean section (44.3%) and maternal mortality (0.6%).

AIM OF THE WORK

The aim was to assess the effects of pregnancy associated diabetes on fetoplacental circulation

PATIENTS AND METHODS

The studied 60 female patients were classified into 3 study groups; 20 pregnant females were diagnosed with gestational diabetes (GDM group), 20 pregnant females were diagnosed with pre-gestational diabetes (PDM group) and the remaining 20 pregnant females formed the non-diabetic group (control group). All the pregnant females fulfilled the inclusion and exclusion criteria of the study and were enrolled in the study.

Full detailed history and obstetric US scan in the end of the 2nd and 3rd trimester done for all patients.

RESULTS

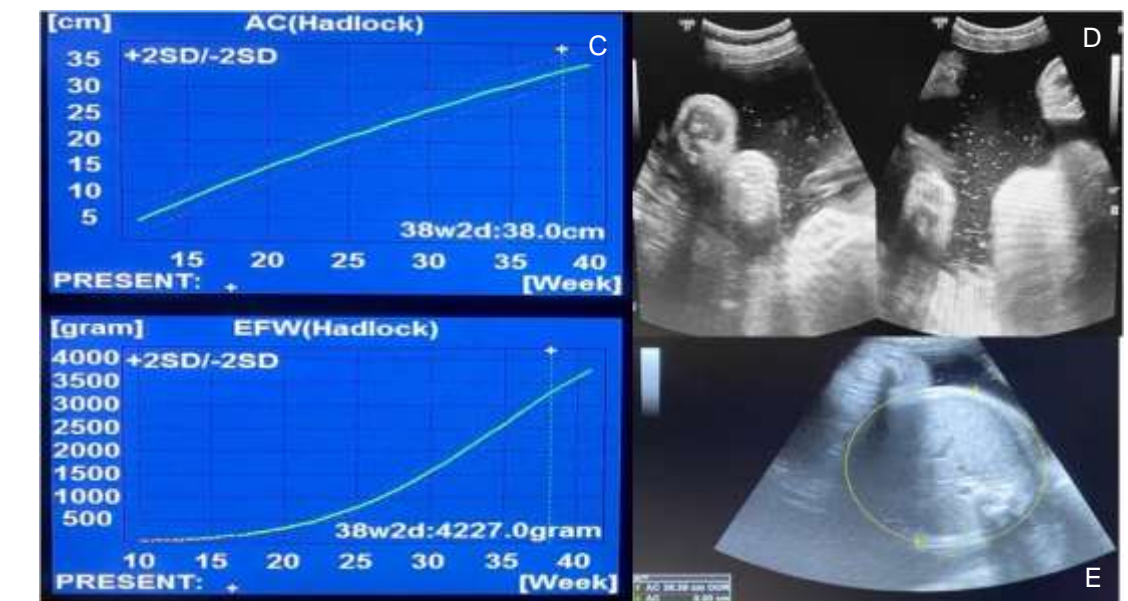
According to the frequent complications occurring in diabetes mellitus among the studied groups, there were highly statistically significant differences as regard fetal abdominal circumference (P= 0.020* for GDM, 0.003* for PDM), high AFI (P= 0.047* for GDM, <0.001* for PDM), fetal macrosomia (P = 0.037* for GDM, 0.017* for PDM) and maternal BMI (P = 0.036* for GDM, 0.014* for PDM).

Table 1: Descriptive analysis of the studied groups according to abdominal circumference (n=60).

According to percentile chart	Control (n= 20)		Gestational (n=20)		Pregestational (n=20)		Test of sig.	
Abdominal circumference (AC)								
	No.	(%)	No.	(%)	No.	(%)	χ^2	^{FE} p
Normal	19	95%	12	60%	11	55%	$\chi^2_1=7.025^*$,	^{FE} p ₁ =0.020
Abnormal	1	5%	8	40%	9	45%	$\chi^2_2=8.533^*$	p ₂ =0.003 ³
	0	0%	0	0%	0	0%	—	—
	<10 th percentile							
>90 th percentile	1	5%	8	40%	9	45%		

Table 2: Distribution of the studied groups according to amniotic fluid index (n=60)

Amniotic fluid index	Control (n= 20)		Gestational (n=20)		Pre-gestational (n=20)		Test of sig.	
	No.	(%)	No.	(%)	No.	(%)	χ^2	^{FE}p
Normal (5-25 cm)	20	100%	15	75%	8	40%	$\chi^2_1=5.714$,	$^{FE}p_1=0.047^*$
Polyhydramnios (>25 cm)	0	0%	5	25%	11	55%	$\chi^2_2=18.455^*$	$^{MC}p_2<0.001^*$
Oligohydramnios (<5cm)	0	0%	0	0%	1	5%		



Figures: 34 yrs. old pregnant female, G5 P3 A1, with abnormal BMI and clinically diagnosed with PDM.

The US images illustrate:

2nd trimester US showed increased AC >97th percentile (C), increased AFI=25.3(B)and increased placental thickness= 4.5 cm (A).

3rd trimester US showed increased AC (F) and polyhydramnios with turbidity (E). Increased EFW >4000 gr, this considered a case of fetal macrosomia (D).

CONCLUSIONS

- There is a significant association between diabetes in pregnancy (both gestational and pregestational DM) and increased risks of adverse fetal and maternal outcome.
- Ultrasound offers an easy, non-invasive diagnos ticapproach to assess the complications during pregnancy such as polyhydramnios, fetal macrosomia and abnormal fetal biometry.
- Maternal obesity and fetal macrosomia were identified as a contributing factor to these adverse outcomes.