

**Comparative study between umbilical, Fetal  
middle cerebral arteries Doppler versus fetal  
heart rate monitoring in pregnant women with  
gestational diabetes mellitus and their relation to  
fetal outcome**

Thesis

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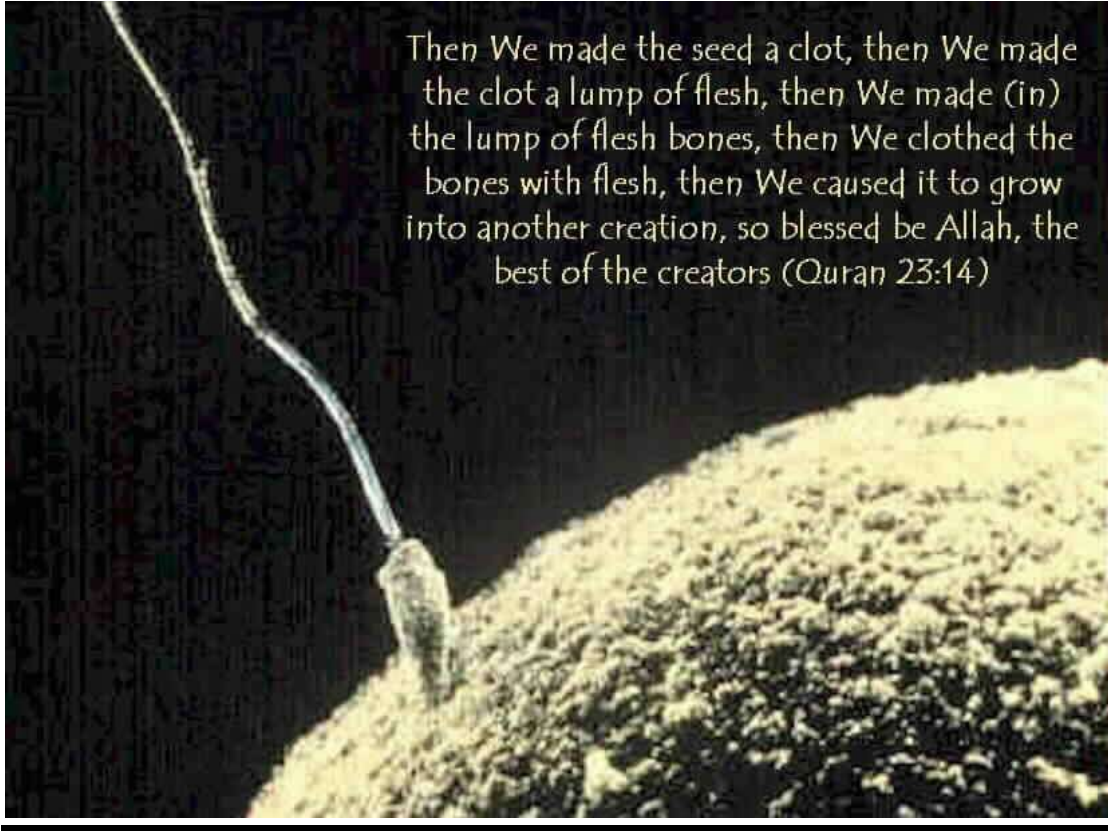
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Then We made the seed a clot, then We made the clot a lump of flesh, then We made (in) the lump of flesh bones, then We clothed the bones with flesh, then We caused it to grow into another creation, so blessed be Allah, the best of the creators (Quran 23:14)

"ثم جعلنا النطفة علقة فخلقنا العلقة مضغة  
فخلقنا المضغة عظاما فكسونا العظام لحما ثم  
أنشأناه خلقا آخر فتبارك الله أحسن الخالقين"  
سورة المؤمنون آية ١٤

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# **LIST OF ABBREVIATIONS**

**AEDV**; Absent end diastolic volume

**AI**; Academic index

**BPP**; Biophysical profile

**BPM**; Beats per minutes

**BMI**; Body mass index

**C/U**; Cerebral to umbilical ratio

**CRI**; Cerebral to umbilical index

**CS**; Cesarean section

**CST**; Contraction stress test

**cCTG**; Computerized cardiotocograph

**CW**; Continuous wave

**FBS**; Fasting blood sugar

**FHR**; Fetal heart rate

**FWV**; Flow Velocity Waveform

**GA**; Gestational age

**GDM**; Gestational diabetes mellitus

**GTT**; Glucose tolerance test

**IDDM**; Insulin-dependent diabetes mellitus

**IGF-1**; Insulin-like growth factor-1

**IGF-2**; Insulin like growth factor –2

**IUGR**; Intrauterine growth restriction.

**MCA**; Middle cerebral artery..

**NIDDM**; Non-insulin dependent diabetes mellitus

**NST**; Non stress test

**PI;** Pulsatility index

**PIH:** Pregnancy induced hypertension

**PROM;** Premature rupture of membranes

**PW;** pulsed wave

**RDS:** Respiratory distress syndrome

**REDV:** Reversed end diastolic volume

**RI;** Resistance index

**S\D;** Systole\Diastole

**UA ;** Umbilical artery.

**UV;** Umbilical vein

**URI;** Umbilical to cerebral

**VD:** Vaginal delivery

## Abstract

Diabetes Mellitus represents an important medical problem during pregnancy, causing perinatal morbidity & mortality. The role of Doppler ultrasound in antenatal surveillance of diabetic pregnancies not complicated by fetal growth restriction or hypertension is controversial & whether the Doppler ultrasound can predict neonatal outcome remains unsettled. Doppler studies of the fetal umbilical & middle cerebral arteries can detect the vascular changes in the fetal circulation that may occur in association with diabetic pregnancies, and whether these findings can be correlated to the fetal outcome or the blood glucose level remains controversial. Another form of fetal surveillance is the use of computerized cardiotocography (CTG). Absent episodes of high variations are thought to be sensitive markers of fetal death.

### Keywords:

*Doppler ultrasonography*

*Cardiotococraphy*

*Biophysical profile*

*Gestational diabetes*

# Introduction and aim of work

Gestational Diabetes mellitus is one of the most common clinical conditions in obstetrics. Pregnancies associated with gestational diabetes mellitus are more likely to develop complications including hypertensive disorders, higher cesarean section rate, increased risk of developing diabetes mellitus later in life and fetal complications including macrosomia, hyperbilirubinaemia, shoulder dystocia and other birth traumas ( **ACOG practice Bulletin, 2001** ).

In this study we will compare pregnancy outcome between a number of females with gestational diabetes followed by Doppler to those followed by CTG.

To optimize the fetal outcome of gestational diabetes mellitus (GDM) pregnancies, fetal assessment plays a vital role .However there is no consensus regarding the best method of antepartum fetal surveillance in GDM pregnancies ( **ACOG practice Bulletin 2001**).

Doppler study of the umbilical artery (UA) flow velocity waveforms is one of the established means of fetal surveillance in high risk pregnancies, but its applications in GDM pregnancies has shown conflicting results (**Johnstone et al, 1992**). It has been suggested that UA Doppler velocimetry

is superior to non stress test in identifying the subgroup of GDM pregnancies with adverse pregnancy outcome (**Bracero et al, 1986**).

On the other hand **Salvesen et al in 1992** concluded from their study that maternal DM was not associated with abnormalities in doppler indices of the placental and fetal circulation .However one factor that have influenced Doppler results is maternal glycemic control. It has been reported that the third trimesteric UA systolic \ diastolic ratio correlated with maternal serum glucose concentration and that S\D ratio was significantly different between well controlled and poorly controlled diabetic patients (**Bracero et al,1989**).

**Fadda et al in 2001** found that perinatal complications were more frequent among those with abnormal fetal Doppler indices.

Another form of fetal surveillance is the use of computerized cardiotocography (CTG) .Absent episodes of high variations are thought to be sensitive markers of fetal health (**Dawes et al, 1992**).This prompted a review by (**Tincello et al in 1998**), They found significant differences in the proportion of patients with absent episodes of high variations but no correlation with fetal outcome was found.

# **REVIEW**