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
Submitted in partial fulfillment of M.D degree in obstetrics and Gynecology

Presented by
Marwa Mohamed Mahmoud Eid
Assistant Lecturer of Obstetrics and Gynaecology

Cairo university

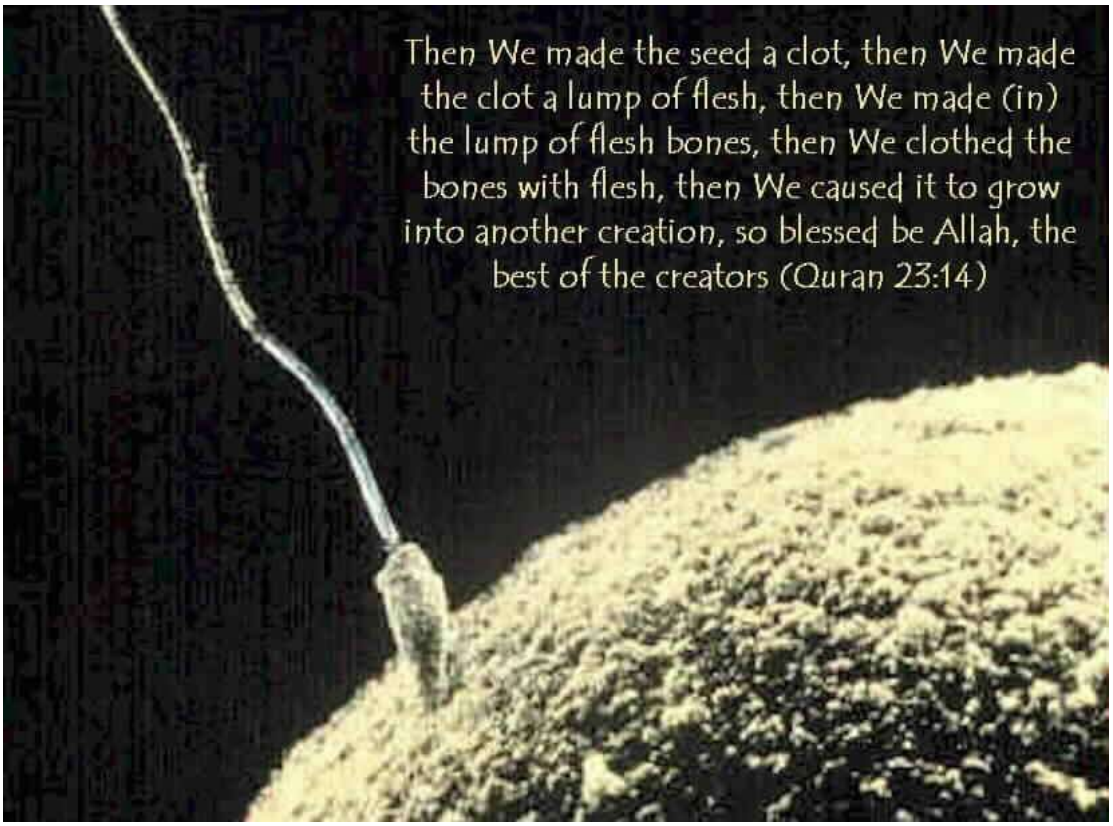
Supervisors
Professor Dr. Omima Abd El Fattah Idrees
Professor of Obstetrics and Gynaecology
Cairo university

Professor Dr. Ayman Abd el Halim Marzouk
Professor of Obstetrics and Gynaecology
Cairo university

Assistant professor Ahmed Mahmoud Sayed Ali
Assistant professor of Obstetrics and Gynaecology
Cairo university

DR.Ahmed Mohamed Maged Mohamed
Lecturer of Obstetrics and Gynaecology

Cairo university
2010



"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

ACKNOWLEDGEMENT

Before and above all, thanks to ALLAH who helped me to finish this work

I would like to dedicate all my success to the soul of the greatest persons in my life/ ***my late mother and my late father Professor DR. Mohamed Mahmoud Eid*** *who will always be the spirit of my life.*

I would like to express my sincere gratitude to Prof. ***OMAIMA ABDEL FATTAH IDREES,*** *for her great support, encouragement, help, and advice throughout this work.*

.

I would like to express my thanks to ***Prof. AYMAN ABD EL HALIM MARZOUK*** *for his concern and support*

I would like to express my thanks to ass. ***Prof. AHMED MAHMOUD SAID ALI*** *for his help and encouragement*

Words can never express my thanks to Dr. ***AHMED MOHAMED MAGED****, for his valuable help, advice, continuous guidance, assistance, encouragement and help without which it could not have been accomplished*

Finally nothing I can tell will express my gratitude to ***my husband*** *for his support and help to accomplish this work.*

LIST OF CONTENTS

List of tables

LIST OF FIGURES

LIST OF ABBREVIATIONS

AEDV: Absent end diatolic volume

AI: Acidemic 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

FVW; 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; Pulsitility index

PIH: Pregnancy induced hypertension

PROM; Premature rupture of membranes

PW; pulsed wave

RDS: Respiratory distress syndrome

REDV: Revered end diatolicvolume

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