بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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MONA MAGHRABY

Doppler Ultrasound Assessment of Fetal MCA and Umbilical Arteries in Patients with Gestational Diabetes versus Normal Pregnancies

Thesis

Submitted in Partial fulfillment of M.D. Degree in
Diagnostic Radiology

By

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بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

قَالُوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

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Marwa Abdallah Aly Hassanin Mahfooz

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List of Abbreviations

Abb.	Full term
AC	Abdominal circumference
AEDF	Absent end-diastolic flow
AFV	Amniotic fluid volume
BPD	Biparietal diameter
BPP	Biophysical profile
CPR	Cerebroplacental ratio
CVD	Cardiovascular disease
ED	End-diastolic velocity
EFW	Estimated fetal weight
FFA	Free fatty acid
FL	Femur length
GDM	Gestational diabetes mellitus
GLUT4	Glucose transporter 4
HC	Head circumference
IGF-1	Growth factor 1
IUGR	Intrauterine growth restriction
LGA	Large for gestational age
MCA	Middle cerebral artery
NICU	Neonatal intensive care unit
NST	Non-stress test
PCOS	Polycystic ovarian syndrome
PI	Pulsatility index

List of Abbreviations (Cont...)

Abb.	Full term
PSV	Peak systolic velocity
REDF	Reversed end-diastolic flow
RI	Resistive index
S/D	Systolic/diastolic
UA	Umbilical Artery

INTRODUCTION

Gestational diabetes mellitus (GDM) is one of the most frequently recorded morbidities of pregnancy. The incidence of GDM has risen over the past 30 years, mainly owing to a global increase in the prevalence of overweight and obesity and an increased pregnancy rate among women aged older than 35 years *(Scott-Pillai et al., 2013).*

The physiopathologic process underpinning the fetal adverse outcomes of maternal GDM is not fully understood but seems to be multifactorial. According to the Hyperglycemia and Adverse Pregnancy Outcomes study, the presence of maternal hyperglycemia is strongly associated with macrosomia and fetal hyperinsulinemia. Furthermore, elective cesarean delivery, neonatal hypoglycemia, premature delivery, birth injury, pre‑eclampsia, admission to the neonatal intensive care unit, and hyperbilirubinemia are associated with the presence of GDM *(Dantas et al., 2018).*

Previous studies showed that materno–placental blood flow might change due to hyperglycemia during the pregnancy. As a consequence, redistribution of blood flow occurs from the peripheral vessels to the brain as a compensatory mechanism to the changes in placental hemodynamics *(Simanaviciute et al., 2006).*

This can be well traced by the Doppler ultrasound measurements of the umbilical (UA) and middle cerebral arteries (MCA) of the fetus *(Dorsey et al., 2018).*

Recently the assessment of the fetal cerebral blood flow velocities has become a suggested method in high-risk pregnancies *(Zanjani et al., 2014).*

AIM OF THE WORK

The aim of this work was to assess the fetal cerebral hemodynamic changes in diabetic pregnancies in comparison to normal pregnancies and its association with placental hemodynamic changes & pregnancy outcome (MCA & umbilical artery duplex).