

Prediction of perinatal outcome in fetuses with intrauterine growth restriction by Doppler ultrasonographic evaluation

THESIS

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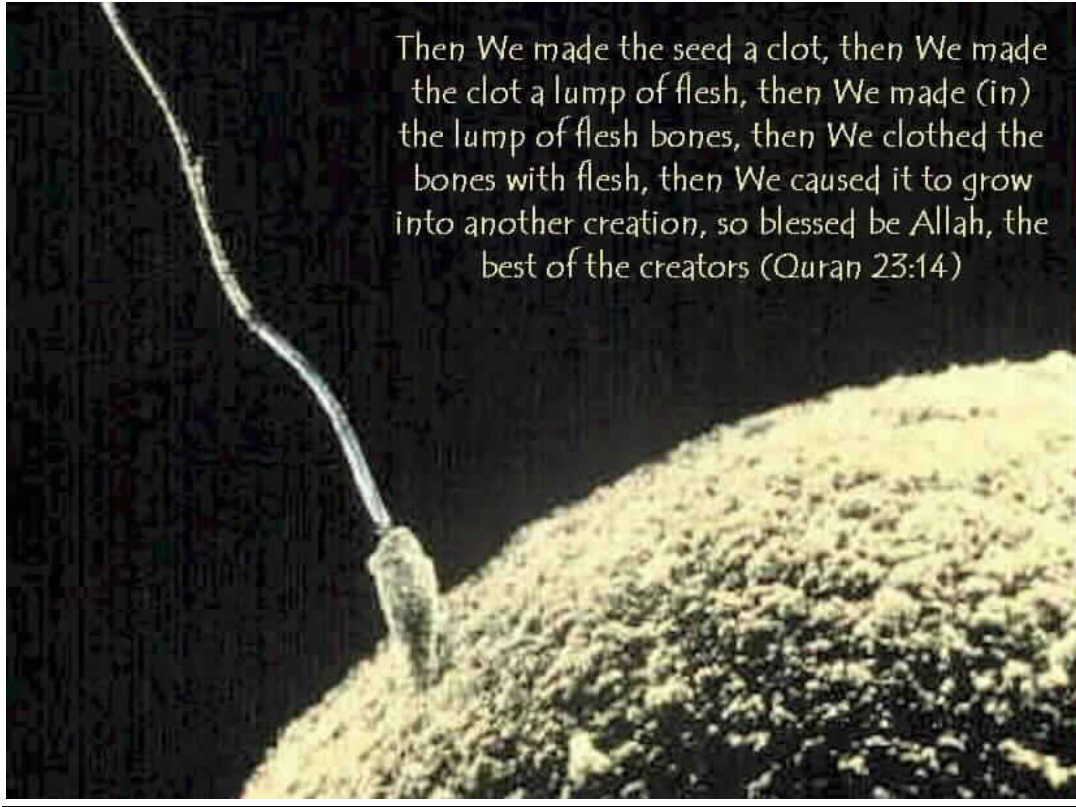
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*To my mother
whose unconditioned love
and support
always give me the strength to carry on.*



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 علقه فخلقنا العلقه
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

AC	Abdominal Circumference
AEDF	Absent End Diastolic Flow
AFI	Amniotic Fluid Index
AFV	Amniotic Fluid Volume
APD	Anteroposterior Diameter
AUA	Average Ultrasound Age
BMI	Body Mass Index
BPD	Bi-Parietal Diameter
BPM	Beats Per Minute
BPP	Biophysical Profile
CNS	Central Nervous System
CRL	Crown Rump Length
CST	Contraction Stress Test
CTG	Cardiotocography
C/U	Cerebro-Umbilical ratio
CVS	Cardiovascular System
DV	Ductus Venosus
ECG	Echocardiography
EFW	Estimated Fetal Weight
FAA	Fetal Abdominal Area
FBS	Fasting Blood Sugar
FGR	Fetal Growth Restriction.
FHR	Fetal Heart Rate
FL	Femur Length
FVW	Flow Velocity Waveform
GA	Gestational age
GIT	Gastrointestinal Tract
GRF	Growth Restricted Fetus
GRIT	nal TrialGrowth Restriction Interventio
GTT	Glucose Tolerance Test
GUT	Genitourinary Tract
HC	Head Circumference
IUGR	Intrauterine Growth Restriction
LBW	Low Birth Weight
LLD	Laterolateral Diameter
L/S	Lecithin Sphingomyelin Ratio
MCA	Middle Cerebral Artery
NICU	nsive Care UnitNeonatal Inte
NST	Non-Stress Test
PI	Ponderal Index
PI	Pulsatility Index

PIH	Pregnancy Induced Hypertension
REDF	Reversed End Diastolic Flow
RI	Resistivity Index
ROC	Receiver Operating Characteristic
SFH	Symphyseal Fundal Height
SGA	Small For Gestational Age.
UA	Umbilical Artery
UPI	Utero-placental insufficiency
WHO	World Health Organization

Abstract

BACKGROUND:

Multi-vessel Doppler ultrasonography and biophysical profile scoring are the principal surveillance tools in pregnancies complicated by fetal growth restriction. The interpretation of these tests done concurrently may be complex.

OBJECTIVE:

This study examines the relationship between arterial and venous Doppler and BPP results in IUGR fetuses and correlates their abnormalities with umbilical artery PH at birth to guide timing of delivery of these fetuses.

DESIGN:

Prospective observational study.

PATIENTS and METHODS:

50 patients diagnosed with intrauterine growth restriction (IUGR); all patients underwent uniform antenatal assessment protocol that includes a four component biophysical profile score and umbilical artery (UA), middle cerebral artery (MCA) and ductus venosus (DV) Doppler ultrasound studies. Most of the patients were delivered by caesarean section. Samples were obtained from the umbilical cord for cord artery PH. Apgar scores at 1 and 5 minutes were recorded.

OUTCOME:

Correlation of Doppler results, BPP and cord blood PH were analyzed.

RESULTS:

There was no significant decrease in GA at time of termination in cases of IUGR with abnormal DV-PIV compared to those with only abnormal UA-PI and MCA PI. Abnormal UA-Doppler was found in 19 patients (38%); 16 of them showed high PI (32%), 2 showed absent end diastolic flow (4%) and 1 showed reversed diastolic flow (2%). Abnormal MCA Doppler was found in 8 patients (16%) and abnormal DV Doppler was found in 9 patients (18%). The Abnormal DV Doppler

was significantly related to poor outcome parameter; pH < 7.20, low Apgar at 5-min and perinatal mortality; when compared with either Abnormal MCA or UA Doppler (p< 0.05). While there was no significant difference between MCA and UA Doppler abnormalities in detecting poor outcome (p> 0.05), BPP was normal in 33 patients (66%), equivocal in 9 patients (18%) and abnormal in 8 patient (16%). The Abnormal and equivocal BPP were significantly related to poor outcome parameter; pH < 7.20, low Apgar at 5-min and perinatal mortality; when compared with normal BPP. (p< 0.05).

CONCLUSION:

The conclusion of our study is that there is an important association between DV abnormalities and adverse neonatal outcomes suggesting that the assessment of this vessel is important to determine the timing of delivery. We also concluded that multi-vessel Doppler ultrasonography, and BPP can effectively stratify IUGR fetuses with placental vascular insufficiency into risk categories.

Keywords:

Doppler ultrasonography – Cardiotococraphy - Biophysical profile - Fetal growth restriction.