Ultrasonographic Study of the Placental Thickness and Modified Placental Grading Together with Uterine Artery Doppler Evaluation as a Predictor for Adverse Fetal Outcome

Thesis

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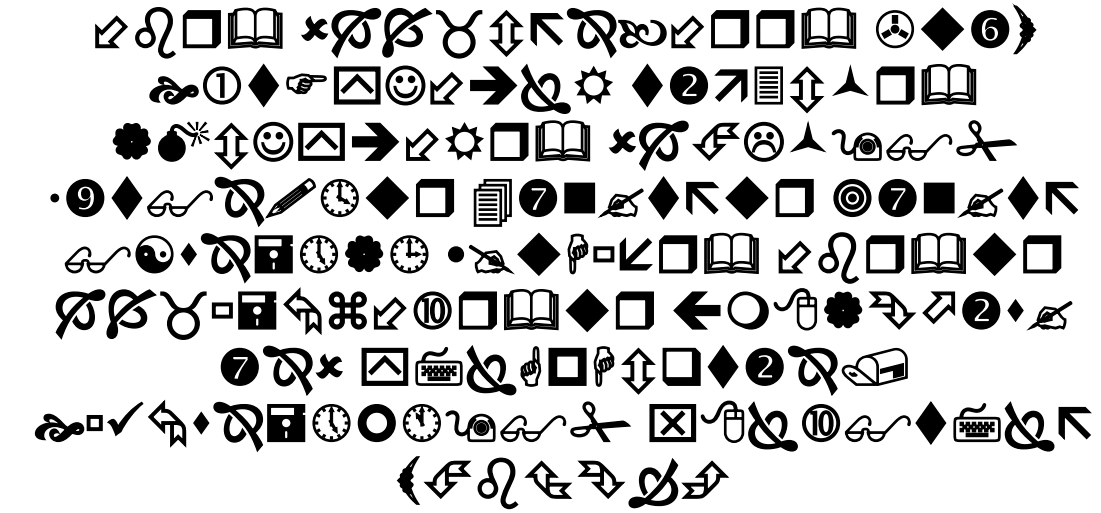
بسم الله الرحمن الرحيم



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List of Abbreviations

AC	:	Abdominal circumference
ACOG	:	American college of obstetricians and Gynecologist
AF	:	Amniotic fluid
AFI	:	Amniotic fluid index
AGA	:	Average for gestational age
BP	:	Blood pressure
BPD	:	Biparietal diameter
FBPP	:	Fetal biophysical profile
CS	:	Cesarean section.
CST	:	Contraction stress test
CTG	:	Cardiotocography
DM	:	Diabetes mellitus
DNA	:	Deoxyribonucleic acid
EDF	:	End diastolic flow
EFW	:	Estimated fetal weight
F/A ratio	:	Femur – to – abdomen ratio
FDMC	:	Fetal daily movement count
FGR	:	Fetal growth restriction
FL	:	Femur length
FVW	:	Flow velocity waveform
G	:	Grade
HC	:	Head circumference
IUFD	:	Intrauterine fetal death
IUGR	:	Intrauterine growth retardation
MBPP	:	Modified biophysical profile
MVP	:	Maximum vertical pocket of amniotic fluid
NICU	:	Neonatal intensive care unit
NND	:	Neonatal death

NST	:	Nonstress test
PI	:	Pulsatility index
PIH	:	Pregnancy induced hypertension
PT	:	Placental thickness
PUBS	:	Percutaneous umbilical blood sampling
PV	:	Probability value
PW	:	Pulsed wave
RDS	:	Respiratory distress syndrome
Rh	:	Rhesus factor .
RI	:	Resistance index
S/D	:	Systole / Diastole ratio
SGA	:	Small for gestational age
St.Devi	:	Standard deviation
UA	:	Uterine artery
UPI	:	Uteroplacental insufficiency
UPD	:	Uniparental disomy
VAST	:	Vibroacoustic stimulation test

Abstract

A high risk pregnancy is one in which the mother or fetus has a significantly increased chance of death or disability – High risk pregnancy includes for examples hypertensive disorders in pregnancy, diabetes mellitus with pregnancy, IUGR, bad obstetric history.

Adverse fetal outcome includes maternal morbidity & fetal morbidity includes low birth weight, low APGAR score, admission to neonatal ICU, and mortality (fetal death).

The aim of this study is to evaluate the clinical usefulness of Doppler analysis of the uterine artery velocimetry waveform as well as the ultrasonagraphic study of placental thickness and maturity as a predictor of adverse fetal outcome.

Key words :

High risk pregnancy, adverse fetal outcome, ultrasound, placental thickness, placental grading, uterine artery Doppler.

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Amal Zakaria M. Baiomy

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Introduction

The Spectrum of adverse fetal outcome ranges from extremes of death and debilitating major handicaps to minor, nearly imperceptible functional or structural defects. It can be defined as low birth weight baby (weight below 10^{th} percentile), low Apgar score, admission to neonatal intensive care unit, IUFD and perinatal mortality. The goal of any antenatal surveillance method is to detect fetal jeopardy and to initiate therapeutic intervention when possible at an early enough stage to avoid major sequalae ***(Neilson and Alfrevic, 2003).***

The ultrasongraphic measurement of placental thickness appears to be of prognostic value in identifying the subsequent occurrence of fetal growth retardation ***(Habib, 2002) .***

Also the measurements of placental thickness is an important parameter for estimation of fetal age along with other parameters especially in the late mid trimester and early third trimester, where the exact duration of pregnancy is not known ***(Mital et al., 2002) .***

Placental grading can be a predictor for fetal outcome. Factors such as chronic hypertension, preeclampsia, intrauterine growth retardation, maternal smoking are associated with accelerated placental maturation ***(Hills et al., 1984 & Proud J, Grant A.M, 1987)***. Whereas, diabetes and fetomaternal immunization are associated with delayed placental maturation ***(Hills et al., 1984).***

Doppler velocimetry is a non invasive technique which uses high frequency sound for investigation of blood flow. The feasibility of its fetal application was first reported by ***Fitzgerald and Drumm 1977*** , It made possible noninvasive investigation of uteroplacental circulation.

Normal uterine artery has a complex wave form in a non pregnant state showing a steep systolic notch and an early diastolic notch with small amount of diastolic flow indicating high vascular resistance ***(Campbell et al., 1983)*** Approximately 4 weeks after implantation well defined low resistance vessels are seen at the site of future placenta ***(Deutinger et al., 1988)***. Most dramatic changes are seen in the second trimester where there is uncoiling of main uterine and spiral arteries ***(Bewely et al., 1989)***.

As pregnancy progress it changes to a low resistance vessel and there is a gradual removal of notch, increase in diastolic flow, and fall in resistance index (RI), RI estimation has been done in uterine artery but it was found to have a low sensitivity to be used alone as a screening tool ***(Bower et. al., 1993)***.

The combined use of sonographic measurement of placental thickness with the routine use of uterine artery Dopper in the second trimester may become a valuable additional tool to help increase our ability in predicting low birth weight infants as well as adverse fetal outcome ***(Habib, 2002).***

Maternal diabetes mellitus is not associated with abnormalities in Doppler indices of the placental or fetal circulations except in those cases complicated by preeclampsia or intrauterine growth retardation ***(Salvesen et al., 1993).***

Aim of the Work

The **aim** of this study is to evaluate the clinical usefulness of Doppler analysis of the uterine artery velocimetry waveform as well as the ultrasonographic study of the placental thickness and maturity as a predictor of adverse fetal outcome.

High Risk Pregnancy

Identification of a high risk pregnancy:

-Definition:

A high-risk pregnancy is one in which the mother or fetus has; significantly increased chance of death or disability ***(Manning et al., 1980)***

High Risk pregnancy includes:

1. Hypertensive disorders in pregnancy.
2. Diabetes mellitus with pregnancy.
3. Multifetal pregnancy.
4. Rh isoimunization and nonimmunologic fetal hydrops.
5. IUGR (intra uterine growth retardation).
6. Recurrent still birth.
7. Recurrent I.U.F.D.
8. Postdate pregnancy.
9. Others:

a- Cardiac diseases with pregnancy.

b- Patients with recurrent poor obstetrical outcomes.

c- Blood diseases with pregnancy.

d- Auto immune diseases with pregnancy.

Objectives of fetal surveillance for high risk patients:

The objectives of antepartum surveillance in the high risk patient are.

1- To determine gestational age.

2- To discover fetal congenital anomalies.

3- To detect abnormalities in fetal growth.

4- To detect and determine the severity of acute and chronic fetal asphyxia.