The Value of Cerebro-Placental Ratio as a Predictor of Neonatal Outcome in Post-Date Pregnancies

Thesis
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Abstract

Post-date pregnancies account for about 5-10% of the deliveries and are known to be associated with increased risk for prenatal complications. The mechanism of fetal complication associated with post dated pregnancy has attributed to progressive placental insufficiency particularly in the presence of decreased amniotic fluid.

Few studies had looked into the Doppler blood flow changes in postdated pregnancies. Some demonstrated redistribution of blood flow in the fetal cerebral circulation in postdated pregnancies with adverse prenatal outcome, and such brainsparing phenomenon is thought to result in oligohydramnios. However, others reported insignificant difference in Doppler indices for postdated pregnancies with or without oligohydramnios.

Key Words:

Post-date pregnancy, Doppler examination, Fetal Circulation, Fetal growth.

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Table of contents

- **List of abbreviations** I
- **List of Tables** III
- **List of Figures** V
- **Introduction** 1
- **Aim of the work**..... 3
- **Review of Literature** 4
  1) Post-date pregnancy..... 4
  2) Doppler examination..... 32
  3) Fetal Circulation..... 67
  4) Fetal growth..... 87
- **Patients and Methods** 116
- **Results** 124
- **Discussion**..... 133
- **Summary & Conclusion**..... 139
- **References** 142
- **Arabic summary** .....

LIST OF ABBREVIATIONS

AC	**:**	Abdominal Circumference
AFI	**:**	Amniotic Fluid Index
AGA	**:**	Appropriately Grown For Gestational Age
BMI	**:**	Body Mass Index
BPD	**:**	Biparietal Diameter
BPP	**:**	Biophysical Profile
BPS	**:**	Biophysical Profile Scoring
CS	**:**	Caesarean Section
C/P	**:**	Cerebro-Placental Ratio
CNS	**:**	Central Nervous System
CRH	**:**	Corticotrophin Releasing Hormone
CRL	**:**	Crown Rump Length
CTG	**:**	Cardiotocography
CW	**:**	Continuous Wave
EDD	**:**	Expected Date Of Delivery
EFW	**:**	Estimated Fetal Weight
FHR	**:**	Fetal Heart Rate
FL	**:**	Femur Length
FOD	**:**	Fronto- Occipital Diameter
GA	**:**	Gestational Age
GROW	**:**	Gestation Related Optimal Weight
HC	**:**	Head Circumference
HPA	**:**	Hypothalamic-Pituitary- Adrenal Axis
ICC	**:**	Immediate Clamping Of Umbilical Cord
IVC	**:**	Inferior Vena Cava
LBW	**:**	Low Birth Weight

LGA	**:**	Large For Gestational Age
LMP	**:**	Last Menstrual Period
MCA PI	**:**	Middle Cerebral Artery Pulsatility Index
MCA RI	**:**	Middle Cerebral Artery Resistance Index
NST	**:**	Non Stress Test
PG	**:**	Prostaglandins
PI	**:**	Pulsatility Index
PW	**:**	Pulsed Wave
RI	**:**	Resistance Index
S/D	**:**	Systolic/Diastolic Ratio
SD	**:**	Standard Deviation
SGA	**:**	Small For Gestational Age
UA PI	**:**	Umbilical Artery Pulsatility Index
UA RI	**:**	Umbilical Artery Resistance Index

List of Tables

Table No.	*Title*	*Page*
Table 1-1	Apgar scoring system	17
Table 2-1	Fluid movement into and out of the amniotic cavity	24
Table 3-1	Predicted Menstrual Age for Biparietal Diamenter (BPD) Measurements	93
Table 4-1	Variability (±SD) in Predicting Menstural Age from Sonographic Measurments (14 to 20 Weeks)	95
Table 5-1	Variability (2±2 SD) in Predicting Menstrual Age in the Second Half of Pregnancy	97
Table 6-1	Predicted Menstrual Age for Head Circumference Measurements (8.5-36.0)	98
Table 7-1	Predicted Menstrual Age for Abdominal Circumference Measurements.	101
Table 8-1	Predicted menstrual age for Femur Length measurements	103
Table 9-1	Birth weight percentiles at term	104
Table 10-1	Equations for estimation of fetal weight	105
Table 11-1	Equations for estimation of fetal weight	106
Table 12-1	Equations for estimation of fetal weight	107
Table 1-2	Mean and standard deviation of age, dated gestational age, BMI, in both study and control groups	121
Table 2-2	Distribution of parity, smoking & previous past obstetric history of postdates pregnancies in control and study groups	122

Table No.	*Title*	*Page*
Table 3-2	Mean and standard deviation in both BPD, FL, AC based gestational age and EFW in both study and control group	123
Table 4-2	Distribution of amniotic fluid volume based on ultrasound assessment in both study and control groups	125
Table 5-2	Distribution of induction of labor in study and control groups	126
Table 6-2	Distribution of the mode of delivery in study and control groups	126
Table 7-2	Presence of meconium stained liquor at the time of delivery in study and control groups	127
Table 8-2	Mean and standard deviation of MCA RI, MCA PI, UA RI, UA PI, CA/UA RI in both study and control groups	128
Table 9-2	Mean and standard deviation of apgar score at 1 minute and 5 minutes in both study and control groups	130
Table 10-2	Sensitivity and specificity of MCA/UA RI in the prediction of neonatal outcome	132

List of Figures

Fig. No	*Title*	*Page*
Figure 1-1	Illustration of the Doppler Effect	36
Figure 2-1	The Relation between the ultrasound beam and the flow	38
Figure 3-1	Example of aliasing and correction of the aliasing	44
Figure 4-1	Spectrum parts used in the calculation of S/D ratio, RI PI	48
Figure 5-1	Normal pregnancy development of the uterine artery	57
Figure 6-1	Normal flow velocity waveforms from the umbilical vein (top) and artery (bottom) at 32 weeks of gestation.	58
Figure7-1	Normal pregnancy development of the umbilical artery	59
Figure 8-1	Flow velocity waveforms of the arteries of the circle of Willis. The values indicate the pulsatility index.	64
Figure 9-1	Flow velocity wave forms of the middle cerebral artery in appropriate-for-gestaional-age (AGA) fetuses at different gestational ages	65
Figure 10-1	Pulsatility index (left) and mean blood velocity (right) in the fetal middle cerebral artery -with gestation (mean, 95^{th} and 5^{th} percentiles)	66
Figure 11-1	Evolution of CRI/URI in a fetus in a normal pregnancy	82
Figure 12-1	The rate of fetal growth by measuring CRL	90
Figure 13-1	The rate of fetal growth by measuring HC	90
Figure 14-1	Birth weight curve (0-36 weeks)	91
Figure 15-1	BPD at 25 menstrual weeks	92
Figure 16-1	Abdominal circumference measurement	100
Figure 17-1	Femur length measurement	103
Figure 1-2	BPD measurement	124

Fig. No	*Title*	*Page*
Figure 2-2	Femur length measurement	124
Figure 3-2	Abdominal circumference measurement	125
Figure 4-2	MCA Doppler showing normal Doppler waveform and indices	129
Figure 5-2	Umbilical artery Doppler showing normal Doppler waveform and indices	129
Figure 6-2	The reciever-operating characteristics analysis of cerebroplacental ratio for Apgar score at 5 minutes	131

INTRODUCTION

The terms postdate, postterm, prolonged and postmature are often loosely used interchangeably to signify pregnancies that have exceeded a duration considered to be the upper limit of normal ***(Cunningham et al., 2010)***.

Postterm includes pregnancies that last longer than 42 weeks while postdate pregnancies include those that last longer than established or estimated date of confinement which is also known the due date in layman's terms (i.e.40 weeks) ***(Alexander et al., 2000).***

The definition of postterm pregnancy generates the erroneous idea that 42 weeks (294 days) is the limit between normality and abnormality. More logical and more useful to the clinician and the patient is to define this limit as the time when the dangers of prolonging the pregnancy exceed the fetal and maternal dangers associated with delivery. Most of the information collected in the last 20 years indicates that this stage is reached prior to 42 weeks. Therefore, it seems reasonable to give attention to all pregnancies extending beyond the expected date of delivery (EDD) and ignore the limit between term and postterm gestations ***(Arias et al., 2008).***

Post term pregnancies account for about 5-10% of the deliveries and are known to be associated with increased risk for prenatal complications ***(Vorherr, 1975)***. The mechanism of fetal complication associated with postdate pregnancy is attributed to progressive placental insufficiency, particularly in the presence of decreased amniotic fluid ***(Adhikari et al., 1998)***

Therefore ultrasound monitoring has become an important component in the antepartum surveillance of postdated pregnancies, and

induction of labor would often be considered for oligohydramnios detected in an otherwise normally grown pastdated pregnancies ***(Johnson et al., 1986)***

A few studies had looked into the Doppler blood flow changes in postdate pregnancies. Some demonstrated redistribution of blood flow in the fetal cerebral circulation in postdate pregnancies with adverse prenatal outcome, and such brain sparing phenomenon is thought to result in oligohydramnios. However, others reported insignificant difference in Doppler indices for postdate pregnancies with or without oligohydramnios ***(Devine et al., 1994; Selam et al., 2000;Bar 1995)***.

The Doppler velocimetry of the umbilical and middle cerebral arteries is a noninvasive clinical approach for evaluation of postterm pregnancy. This technique is thought to measure vessel tonus or downstream peripheral resistance of feto-placental or uteroplacental circulation ***(Trudinger et al., 1985)***

AIM OF THE WORK

The aim of this study is to evaluate the value of Cerebro-Placental ratio as a predictor of neonatal outcome in postdate pregnancies(40 to 42weaks).

Post-date pregnancy

Definition:

The terms postdate, postterm, prolonged and postmature are often loosely used interchangeably to signify pregnancies that have exceeded a duration considered to be the upper limit of normal ***(Cunningham et al., 2010)***.

Postterm includes pregnancies that last longer than 42 weeks while postdate pregnancies include those that last longer than established or estimated date of confinement which is also known the due date in layman's terms (i.e.40 weeks) ***(Alexander et al., 2000).***

The standard internationally recommended definition for postterm pregnacies endorsed by the American college of Obstetricians and Gynecologists (2004) is 42 completed weeks (294 days) or more from the first day of the last menstrual period. This definition depends on the onset of a menstrual flow assuming that it was followed by ovulation 2 weeks later. So, some pregnancies are not actually postterm, but rather the result of an error in estimation of gestational age because of faulty recall of the dates of menstruation or delayed ovulation as there is a large variation in menstrual cycles in normal women and so, menstrual dates are frequently inaccurate in predicting postdate pregnancies ***(Munster et al.,1992)***

Thus, there is some inevitable imprecision when attempting to define prolonged pregnancy, but because there is no methods to identify pregnancies that are truly prolonged, all pregnancies judged to be 42

completed weeks should be managed as if abnormally prolonged***(Cunningham et al., 2010).***

The definition of postterm pregnancy generates the erroneous idea that 42 weeks (294 days) is the limit between normality and abnormality. More logical and more useful to the clinician and the patient is to define this limit as the time when the dangers of prolonging the pregnancy exceed the fetal and maternal dangers associated with delivery. Most of the information collected in the last 20 years indicates that this stage is reached prior to 42 weeks. Therefore, it seems reasonable to give attention to all pregnancies extending beyond the expected date of delivery (EDD) and ignore the limit between term and postterm gestations ***(Arias et al., 2008).***

Postmature should be used to describe the infant with recognizable clinical features indicating a pathologically prolonged pregnancy. So, postmature is reserved for a specific clinical fetal syndrome ***(Cunningham et al., 2010).***

Incidence:

According to the International Federation of Gynecologists and Obstetricians (1986), the incidence of prolonged pregnancy is about 5- 10 %. This wide variation is due to the difficulty in calculation of accurate date of delivery. ***(Neilson, 2004).***

Others estimate the frequency of prolonged pregnancy to vary between 4% and 14 % ***(Manchanda et al., 1999).***

Ultrasonographic examination in first trimester has been shown to reduce the incidence of truly prolonged pregnancy from about 10% to low