

Placental thickness an estimator of fetal growth variables

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Abstract

Objectives: 1.To find out the relationships between fetus growth variables with placental thickness.2.To estimate the growth variables through the regression analysis models. **Methodology:** 240 III trimester ante-natal mothers were selected as first 20 singleton pregnant mothers through the months of January to December 2016. The Ultra Sona Graphed statistics like Abdominal Circumference (AC), Biparietal diameter (BPD), Femer length (FL), LMP based gestational age (GA) and Placental Thickness (PT) were collected. The study subjects 240 singleton Ante Natal mothers fetal growth of above variables were analyzed and interpreted accordingly. **Results:** The placental thickness determined the BPD as 60.1%, AC as 64.8%, FL as 67.7% and 66.7%. Based on this, four regression equations were being computed for estimating the BPD, AC, FL and GA. **Discussions:** The main function of the placenta is exchanging nutrients, metabolic products and gases to the fetus. The placental thickness can be an indicator of IUGR. **Conclusions:** Early detections of fetal growth may prevent the perinatal, neonatal and maternal mortalities.

Key Words: Placental thickness- Estimator- Fetal- Growth.

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INTRODUCTION

Advent of Ultra Sonography (USG) is a boon in estimating the fetus and its other growth variables. The placenta is playing a role in producing growth hormones of fetus. One of the growth hormones is substance somatomammotropin. The fetal growth variable such as abdominal circumferences (AC) and Biparietal diameter (BPD) are used in the estimation of gestational age and weight of the fetus. The femer length (FL) is also used an accurate estimator of gestational age. The Sherpard's method is also used with BPD and AC with some variance from actual birth weight. The growth variables

are being affected by insufficient nutrients reaching the fetus through the thin placenta. The Intrauterine Growth Retardation (IUGR) may be caused by thin placenta and IUGR is associated with the placenta thickness less than 2.5cm¹. The role of Ultra sonography in obstetrics management is immense. But the variables like fetal crown rump length (CRL), Biparietal diameter (BPD), Head Circumference (HC), Femur Length (FL), Abdominal Circumference (AC) have some draw backs in estimating the Gestational age (GA). So, Placental Thickness (PT) is an emerging variable for supplementing gestational age with minimal error. Diseases and abnormalities affecting fetus can be indicated by an abnormal size of the placenta during 2nd and 3rd trimester. Small placenta is associated with IUGR. More than 5 cms before 40 weeks are abnormal in conditions like infection, anaemia or Triploidy, Hydrops, congenital anomaly, hypertension, diabetes, placental anomalies and hydrominos. On the basis of our above thoughts the study was aimed to investigate the correlation and regressions of placental thickness with related fetal growth variables such as AC, BPD, FL and GA².

MATERIAL AND METHODS

A random sample of 240 III trimester ante-natal mothers was selected as first 20 singleton pregnant mothers through the months of January to December 2014 from the obstetric records of the hospital. Among them 154 and 86 were primi and multi paras respectively. The data were obtained from the records of a teaching hospital in Tamil Nadu. The Ultra Sona Graphed statistics like Abdominal Circumference (AC), Biparietal diameter (BPD), Femer length (FL) and Placental Thickness (PT) were collected. The study subjects 240 singleton Ante Natal mothers fetal growths of above variables were analyzed and interpreted accordingly [3].The statistical procedures were performed with the help of statistical package IBM SPSS statistics - 20. The P- values less than or equal to 0.05 ($P \leq 0.05$) were considered as statistically significant.

RESULTS

The correlation between the fetal growth variables like BPD, AC and FL with PT were tabulated in the table-1.

Table 1: The relationships between Placental Thickness with BPD, AC and FL:

Variables	r	n	significant	r ²	% determined
PT X BPD	0.775	240	P<0.001	0.601	60.1
PT X AC	0.805	240	P<0.001	0.648	64.8
PT X FL	0.823	240	P<0.001	0.677	67.7
PT X GA	0.817	240	P<0.001	0.667	66.7

The above table-1 states the determinants of BPD, AC, FL and GA by the PT. The product moment correlation coefficient of PT with AC, FL and GA were 0.775, 0.805, 0.823 and 0.813 respectively. The above correlation coefficients (r) were statistically very highly significant ($P < 0.001$). The BPD was determined by the PT as 60.1%. Similarly, The AC, FL and GA were determined as 64.8%, 67.7% and 66.7% respectively. The following growth variables may be estimated by PT. They are BPD, AC, FL and GA with the help of the regression equations.

BPD= 38.241+1.307(PT)

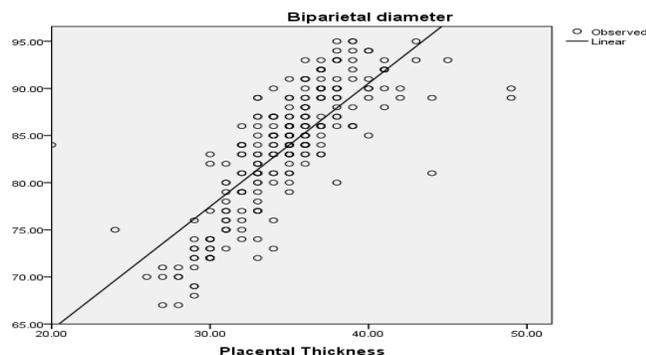


Figure 1: The regression equation is called Biparietal diameter(Y) on Placental Thickness (X) (Y on X).

AC=73.8+6.581(PT)

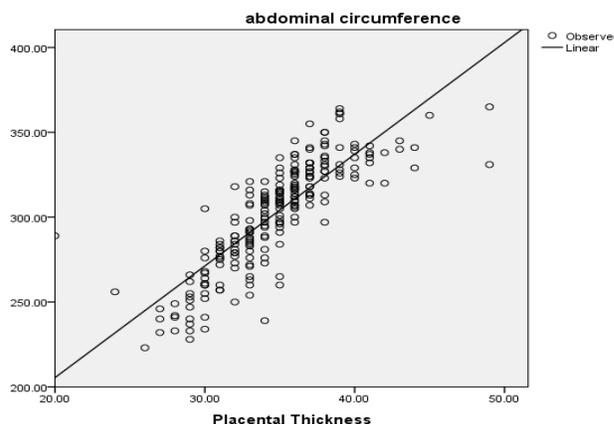


Figure 2: The regression equation is abdominal circumference (Y) on placental Thickness (X). (Yon X)

FL=21.399+1.286 (PT)

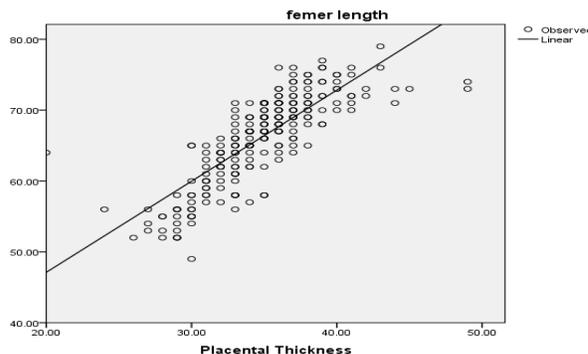


Figure 3: The regression equation is Femur length(Y) on placental Thickness (X) (Yon X)

GA=15.238+0.558 (PT)

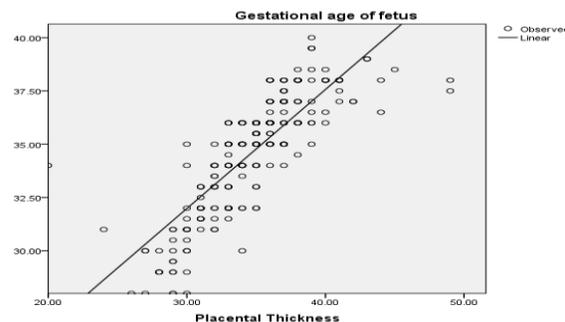


Figure 4: The regression equation is gestational age(y) on placental Thickness(X) (Y on X)

The above four equations are used for the estimation of BPD, AC, FL and GA. In any one of the equation, the placental thickness value is substituted, the respective fetal growth of the respective variable may be estimated.

DISCUSSIONS

The placenta is a fetal organ, which provides a physiologic link between a pregnant woman and the fetus. The main function of the placenta is to exchange nutrients, metabolic products and gases between maternal and fetal blood streams^[4]. The lay women who do not know the exact LMP, the placental thickness will reveal the exact GA, since the growth of PT is positively correlated. Not only that the placenta synthesis or secretes steroid hormones, progesterin and estrogens and protein hormones. The IUGR is assessed by placenta thickness <2.5 mm and thick placenta is an indication of maternal diabetes mellitus⁵. The regression analysis of equations 1 through 4 can be used for estimating the fetal growth variables as well as to establish a relation between them. The cut off value of thick placenta was 37.5mm and for thin placenta was 29 mm. Over all mean placental thickness was 37.5 mm. It was observed that the placental thickness gradually increased from 11 mm at 11 weeks to 38.33 mm at 40 weeks⁶.

CONCLUSION

In emergency obstetrics procedures the estimation of fetal growth variables are acute necessity. At this context if the placental thickness was known, the other measurements may be calculated since they are positively correlated. The findings of the study suggests that the placental thickness be routinely carried out during obstetrics ultrasound scan since the placental thickness determines the BPD as 60.1%, AC as 64.8%, FL as 67.7% and 66.7%. Current study showed a significant positive correlation between placental thickness with femur lengths, Biparietal diameter and abdominal circumference. Accurate determination of gestational age has been important for the determination of pregnancy.

Measurement of placental thickness is an important variable for gestational age in cases where the exact duration of pregnancy is not known. Ie. Some mothers, where last menstrual period is not sure and pregnant ladies with irregular cycles^[7]. Based on above problems, the termination of pregnancy with accurate determination of gestation age can be measured by placental thickness. So that perinatal and neonatal morbidity and mortality can be reduced and even to be zero.

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