

Original Research

Assessment of placental thickness using USG

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ABSTRACT:

Background: Accurately knowing the Gestational Age (GA) is essential for both the finest prenatal care and a successful baby's birth. The present study was conducted to assess placental thickness using USG. **Materials & Methods:** 72 antenatal women were selected. To identify any fetal abnormalities, a transabdominal scanning (3.5 MHz transducer) was utilized. The measurements of the head circumference, femur length, crown rump length, belly circumference, and biparietal diameter were used to calculate the gestation age. At its maximum thickness, each placenta was measured perpendicular to the uterine wall with a precision of 1 mm. **Results:** The mean placental thickness in first trimester was 16.4±2.3 mm, in second trimester was 25.7±4.6 mm and in third trimester was 34.2±5.3 mm. The difference was significant (P< 0.05). There was a correlation between placental thickness & gestational age (P< 0.05). **Conclusion:** The GA can be predicted using PT. For every illness condition, the subnormal PT for the relevant GA should be assessed. Therefore, it is recommended that PT be measured on a regular basis during obstetric USGs.

Keywords: Gestational age, Placenta, Transabdominal scanning

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INTRODUCTION

Accurately knowing the Gestational Age (GA) is essential for both the finest prenatal care and a successful baby's birth.¹ When interpreting biochemical tests, such as screening for expanded maternal serum biomarkers (Human Chorionic Gonadotrophin, Alfa Foeto protein, and the levels of oestrogen and progesterone), for the risk assessment of various foetal anomalies, and assessing foetal growth by differentiating between normal and pathological foetal development, the gestational age is crucial.²

This enables obstetricians to implement strategies that will maximize the result for the fetus. The gestational age has an impact on the interventional modality that is employed when an abnormality is discovered.³ Knowing the gestational age is crucial for almost all significant clinical decisions, such as elective labor induction, caesarean sections, etc. Pregnancy dating begins even before fertilization because the gestational age, which is determined from the first day of the last menstrual period, is roughly 280 days.⁴

One of the most frequent clinical issues in radiology is determining the gestational age. By evaluating the fetal measures, such as the femur length (FL), head circumference (HC), abdominal circumference (AC), and biparietal diameter (BPD), ultrasound (USG) is frequently used to estimate the gestational age.⁵ Because an ultrasonograph relies on the technical expertise of its observers, it is susceptible to observer bias. Additionally, the accuracy of the gestational age estimation may be reduced by the fetal characteristics, various measurement methods, and positioning issues.⁶ The present study was conducted to assess placental thickness using USG.

MATERIALS & METHODS

The study was carried out on 72 antenatal women. All gave their written consent to participate in the study. Data such as name, age, etc. was recorded. To identify any fetal abnormalities, a transabdominal scanning (3.5 MHz transducer) was utilized. The measurements of the head circumference, femur length, crown rump

length, belly circumference, and biparietal diameter were used to calculate the gestation age. The cross section showed the maximum placental thickness, which was determined at the level of the umbilical cord insertion. At its maximum thickness, each placenta was measured perpendicular to the uterine

wall with a precision of 1 mm. While undergoing the ultrasonography, the patients were in the supine posture with their bladders full. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Placental thickness based on gestational age

Gestational age	Mean	P value
First trimester	16.4±2.3	0.01
Second trimester	25.7±4.6	
Third trimester	34.2±5.3	

Table I shows that mean placental thickness in first trimester was 16.4±2.3 mm, in second trimester was 25.7±4.6 mm and in third trimester was 34.2±5.3 mm. The difference was significant (P< 0.05).

Graph I Placental thickness based on gestational age

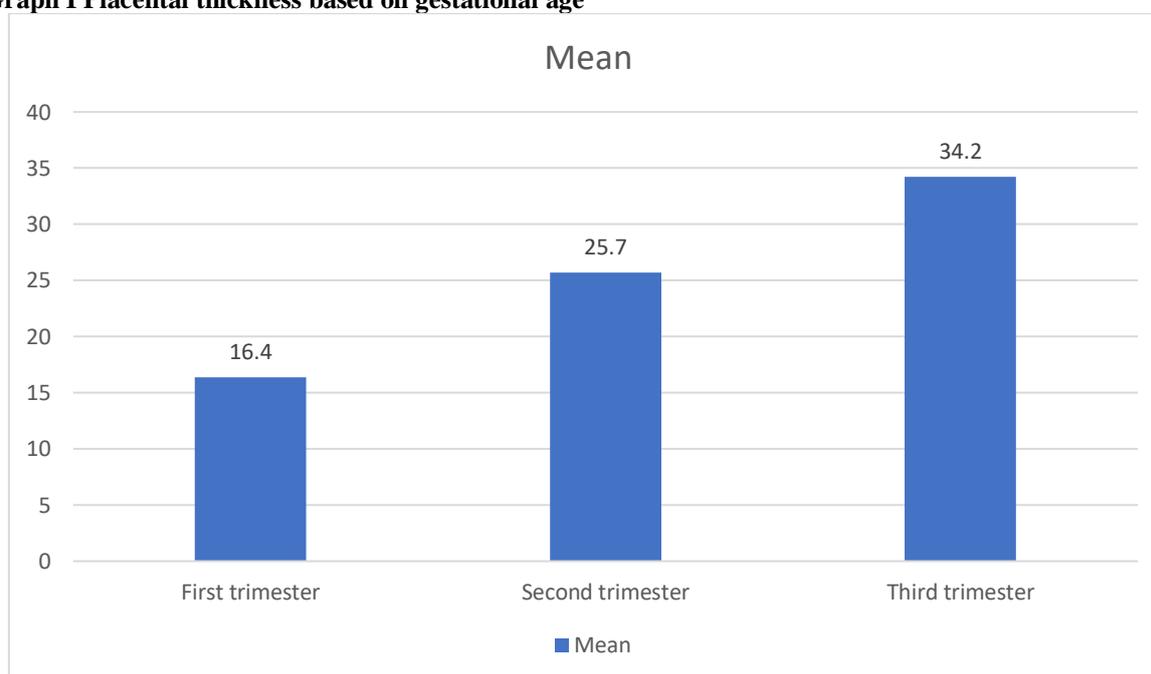


Table II Correlation between placental thickness & gestational age

Gestational age	r	P value
First trimester	0.64	0.01
Second trimester	0.82	0.01
Third trimester	0.89	0.01

Table II shows correlation between placental thickness & gestational age(P< 0.05).

DISCUSSION

The placenta is a materno-foetal organ which forms a little later than the foetus; it nourishes and protects the foetus and it dies out after the delivery of the baby. Since it is closely related to the foetus and the mother, it acts like a mirror, reflecting the statuses of both the mother and the foetus.⁷Accurate assessment of gestational age is an important part of any obstetrical examination. Clinical assessment of gestational age from first day of last menstrual period (LMP) is fraught with errors.⁸ Beazley and Underhill (1971) and Campbell (1974) reported that first day of last menstrual period was an unreliable indicator of actual

gestational age. Before seven weeks, biological variants such as gestational sac, yolk sac, fetal pole, cardiac blink could be considered for determination.⁹With improved resolution of diagnostic ultrasound equipments in the past decade, numerous structures have been shown to be highly correlated with gestational age like placental thickness, foot length, hand length, scapular length, kidney length, transcerebellar diameter, rib length etc.¹⁰ The placenta is a materno-fetal organ which begins developing at the implantation of the blastocyst and delivered with the fetus at birth. It has an important role in metabolic, endocrine and

immunological function, besides being responsible for nutrition, respiration and excretion of the fetus.¹¹ The present study was conducted to assess placental thickness using USG.

We observed that the mean placental thickness in first trimester was 16.4±2.3 mm, in second trimester was 25.7±4.6 mm and in third trimester was 34.2±5.3 mm. Ohagwu et al¹² investigated placental thickness as a parameter for estimating gestational age in normal singleton pregnancies in 730 Nigerian women. Sonography was carried out using Sonoscape SSI 600 ultrasound machine with 3.5MHz transducer. The maximum mean placental thickness of 45.1 ± 6.4mm was recorded at 39 weeks gestation. There was a fairly linear increase in mean placental thickness with gestation age. There was significant and strong positive correlation between placental thickness and gestational age. Placental thickness appears promising as an accurate indicator of gestational age in singleton pregnancies in women.

We found that there was a correlation between placental thickness & gestational age (P< 0.05). Karthikeyan et al¹³ aimed at estimating the (Placental Thickness) PT and at investigating the relationship between PT and the foetal growth parameters in normal singleton pregnancies. The maximum mean PT in the 1st, 2nd, 3rd and the combined trimesters were 16.5 mm, 23.78 mm, 35.81 mm and 28.49 mm respectively. The correlation between PT and the other foetal parameters was investigated by Pearson's correlation analysis. The values were expressed as mean + standard deviation. The statistical tests were two-tailed, with a p value of < 0.01, which indicated the statistical significance. There was a strong positive correlation between PT and GA, with the correlation coefficient values for the 1st, 2nd and 3rd trimesters being r = 0.609, r = 0.812 and r = 0.814 respectively. There was a significant positive correlation between PT and BPD, AC, FL, ABC, HC and FW also. The mathematical relationships between PT and GA, BPD, AC, FL, ABC, HC, FW were derived by regression analysis. The regression equation which was derived was $(x - 22.92) = (0.3604)(w - 27.86446) + (1.0256)(y - 1.1678) + (0.0015)(z - 216.2841) + (0.1047)(t - 43.1555) + (0.027)(u - 192.79000) + (0.0042)(v - 60.3725)$, where x = GA in weeks, w = PT in mm, y = FW in kg, z = HC in mm, t = FL in mm, u = AC in mm and v = BPD in mm.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that the GA can be predicted using PT. For every illness condition, the subnormal PT for the relevant GA should be assessed. Therefore, it is recommended that PT be measured on a regular basis during obstetric USGs.

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