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Evaluation of Placental Thickness as a Sonological Indicator for Estimation of Gestational Age

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Abstract: ***Accurate estimation of gestational age (GA) is crucial in obstetric care for monitoring fetal development and timing delivery. This study evaluates placental thickness as a supplementary sonological marker to estimate gestational age and examines its relationship with traditional biometric parameters.***

Keywords: Gestational age estimation, Placental thickness, Obstetric ultrasound, Fetal growth monitoring, Sonographic markers

1. Introduction

Gestational age estimation is essential in obstetrics for pregnancy management and evaluating fetal development. Errors in GA estimation can lead to complications such as prematurity, postmaturity, and increased perinatal mortality. This study explores the use of placental thickness measured via ultrasound as a reliable predictor of gestational age.

2. Objectives

- To estimate gestational age using standard biometric parameters: Crown-Rump Length (CRL), Biparietal Diameter (BPD), Abdominal Circumference (AC), Head Circumference (HC), and Femur Length (FL).
- To measure placental thickness at the umbilical cord insertion site using ultrasound.
- To correlate placental thickness with gestational age.

3. Materials and Methods

Source of Data: Pregnant women between 11–40 weeks of gestation.

Study Duration: July 2024 – January 2025

Sample Size: 300

Inclusion Criteria:
Pregnant women attending routine antenatal ultrasound at the Department of Radiodiagnosis, Sri Siddhartha medical college and hospital

Exclusion Criteria:
- PIH, diabetes, IUGR, hydrops fetalis, congenital malformations, twins
- Polyhydramnios or oligohydramnios
- Morphological placental variations (lobed, succenturiate, membranacea, circumvallate)
- Marginal/battledore or velamentous cord insertions
- Poor visualization due to obesity or fetal shadowing

Statistical Analysis: Descriptive statistics; results on continuous variables are shown as Mean ± SD. 95% Confidence Intervals for placental thickness based on gestational age.

4. Results

1) Age Distribution:
- Women aged 18–38 years
- Mean age: 25 years

2) Placental Position Distribution:
- Anterior: 90
- Posterior: 83
- Fundal: 72
- Lateral: 55

3) Placental Thickness vs. Gestational Age:
- 11–35 weeks: thickness ≈ gestational age
- 36–40 weeks: 1–3 mm less

4) Regression: Placental Thickness = 0.918 × GA + 1.787
- Placental Location Comparison:
- Group I: Anterior + Lateral
- Group II: Posterior + Fundal
- No significant difference

Representative Cases:
- Case 1: 27 yrs, primigravida, 4 months amenorrhea
- Case 2: 20 yrs, 2nd gravida, 9 months
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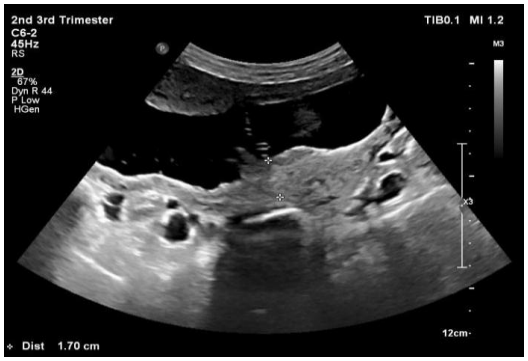
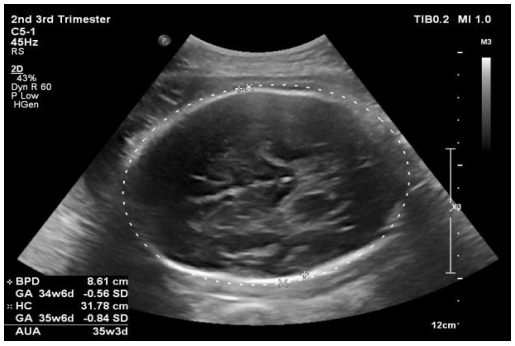
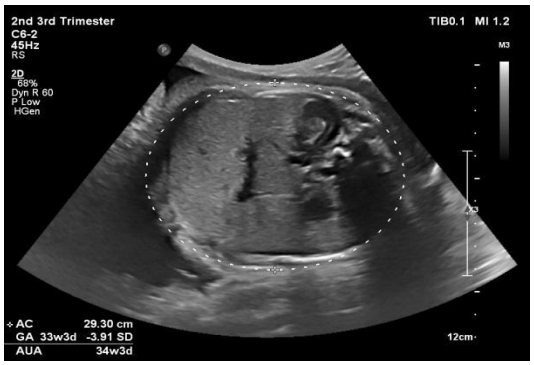
5. Representative Cases

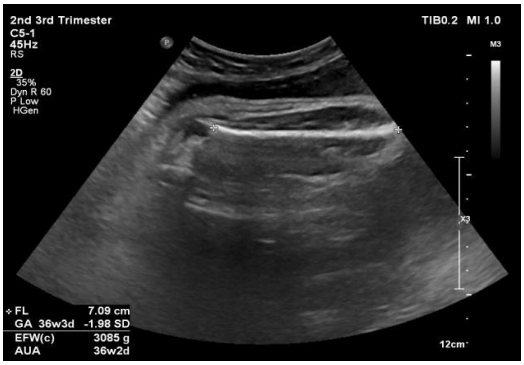
Case 1
27 years, primigravida with 4 months of amenorrhea

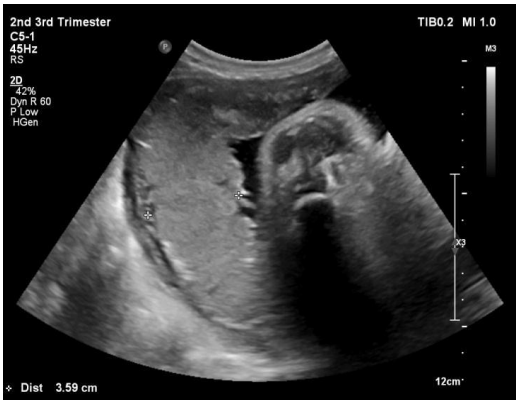


Case 2:
20 years, 2nd gravida with 9 months of amenorrhea









6. Discussion

Placental thickness is a valuable alternative and adjunct to standard biometric parameters in GA estimation. It shows a linear increase from 11 to 35 weeks and then plateaus slightly toward term. This pattern matches findings in previous studies by Grannum, Berkowitz, and Hoddick.

7. Limitations

- Cross-sectional design
- Sonographic challenges in cord insertion imaging
- Obesity and fetal shadowing reduce measurement accuracy

8. Conclusion

- Placental thickness increases linearly with gestational age up to 35 weeks
- After 36 weeks, the increase tapers by 1–3 mm
- It is a reliable sonological marker to estimate gestational age irrespective of placental location

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