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ROLE OF ULTRASONOGRAPHY IN ASSESSING THE RELATIONSHIP BETWEEN THIRD TRIMESTER PLACENTAL THICKNESS AND NEONATAL OUTCOME

Radio-Diagnosis

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ABSTRACT

Background By facilitating metabolic exchange, food delivery, gaseous exchange, hormone regulation, and immunological protection, the placenta is essential to fetal growth and survival. Ultrasonography measurements of placental thickness have become a valuable, repeatable, and non-invasive metric for evaluating placental health and fetal wellbeing. **Aim** To evaluate the relationship between ultrasonographic placental thickness in the third trimester and neonatal outcome. **Materials and Methods** This cross-sectional observational hospital-based study was carried out in the Department of Radiodiagnosis. At 32 and 36 weeks of gestation, a total of 100 pregnant women had routine prenatal ultrasounds. Sonographic measurements of placental thickness were linked with postpartum neonatal outcomes. **Results** Normal placental thickness was linked to favorable neonatal outcomes, such as normal birth weight, improved Apgar scores, and fewer NICU admissions; abnormally thin or thick placentae were linked to unfavorable fetal outcomes. Placental thickness showed a progressive increase with gestational age. Positive neonatal outcomes, such as normal birth weight, improved Apgar scores, and fewer NICU admissions, were linked to normal placental thickness. Negative fetal outcomes were linked to abnormally thick or thin placentae. **Conclusion** Regular evaluation of placental thickness can assist identify high-risk pregnancies, improve antenatal surveillance, and improve perinatal result. Ultrasonographic placental thickness is a straightforward, non-invasive, and reliable measure for predicting neonatal outcome in the third trimester. Prenatal surveillance, perinatal outcome, and the identification of high-risk pregnancies can all be improved by routine placental thickness assessment.

KEYWORDS

Placental Thickness, Ultrasonography, Neonatal Outcome, Third Trimester, Placenta, Fetal Well-being

INTRODUCTION

The placenta is a vital fetal organ responsible metabolism, hormone regulation, immunological control, gaseous exchange, and nutrient transport. Proper fetal growth and development depend on the maintenance of appropriate placental architecture and function. It has been demonstrated that placental thickness, which indicates placental functional capacity, gradually increases with gestational age.

A number of maternal and fetal diseases are linked to changes in placental thickness. While decreasing placental thickness is linked to hypertensive diseases, placental insufficiency, and intrauterine growth limitation, increased placental thickness has been documented in gestational diabetes mellitus, Rh incompatibility, intrauterine infections, and fetal hydrops.

The current study was conducted to assess the relationship between placental thickness measured by ultrasonography at 32 and 36 weeks of gestation and neonatal outcome. Placental thickness measurement during pregnancy has gained importance as an additional parameter for assessing fetal well-being and predicting neonatal outcome. Ultrasonography offers a safe, non-invasive, and reproducible method for evaluating placental morphology and thickness. Placental thickness measurement throughout pregnancy has become a crucial supplementary metric for evaluating fetal health and forecasting newborn outcomes.

The goal of the current study was to assess the association between newborn outcome and placental thickness as determined by ultrasound at 32 and 36 weeks of gestation.

MATERIALS AND METHODS

Study Design: Cross-sectional observational hospital-based study.

Study Duration: One and a half years.

Study Population: Pregnant women attending the Department of Radiodiagnosis for routine antenatal ultrasonography.

Sample Size: 100 pregnant women.

Inclusion Criteria

Singleton pregnancy
Pregnant women undergoing routine antenatal ultrasonography
Gestational age corresponding to 32 and 36 weeks
Patients willing to participate in the study

Exclusion Criteria

Multiple pregnancies
Congenital fetal anomalies
Placental abnormalities interfering with accurate measurement
Patients unwilling to participate

Methodology

Ultrasonographic examination was performed at 32 weeks and repeated at 36 weeks of gestation. Placental thickness was measured at the site of umbilical cord insertion with the ultrasound probe placed perpendicular to the placental surface.

Placental thickness measurements were correlated with Birth weight, Apgar score, NICU admission, Maternal weight, Parity

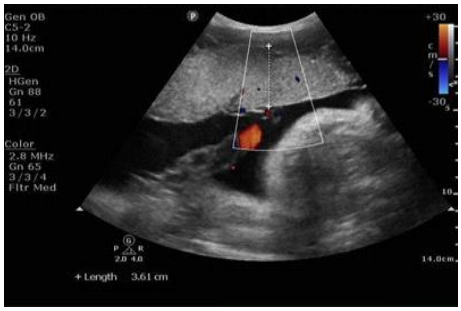

Figure 1: Method of Measurement of Placental Thickness. Measurements were taken at both 32 weeks and 36 weeks.

Statistical Analysis

Collected data were entered and analysed using appropriate statistical methods. Correlation between placental thickness and neonatal outcome variables was assessed using standard statistical tests.

RESULTS

A progressive increase in placental thickness with advancing gestational age was observed.

Placental Thickness and Birth Weight: Normal placental thickness was associated with normal neonatal birth weight. Thin placentae were associated with low birth weight and increased incidence of fetal growth restriction.

Placental Thickness and Apgar Score: Neonates born to mothers with normal placental thickness had better Apgar scores compared to those with abnormal placental thickness.

Placental Thickness and NICU Admission: Increased NICU admissions were observed in pregnancies with abnormally thin or thick placentae.

Maternal Weight and Placental Thickness: A positive correlation was observed between maternal weight and placental thickness.

Parity and Placental Thickness: Placental thickness demonstrated correlation with parity, though the association varied among study subjects.

Table 1: Distribution of Placental Thickness at 32 Weeks [n = 100]

Placental Thickness (mm)	Frequency	Percentage (%)
25–30	29	29.0
31–35	61	61.0
36–40	10	10.0
Total	**100**	**100**

Sixty one percent of the women at 32 weeks (61 out of the total 61 participants) were observed to have normal placenta thickness (31-35mm). Later analysis, thin placentas (<10th percentile i.e. 28 mm) and thick placentas (>90th percentile 36 mm) were quite uncommon, but they are experiencing worse fetal outcomes.

Table 2: Distribution of Placental Thickness at 36 Weeks [n = 94(term Babies)

Placental Thickness (mm)	Frequency	Percentage (%)
25–30	6	6.4
31–35	25	26.6
36–40	56	59.6
41–45	7	7.4
Total	**94**	**100**

Thickness of placental lining improved in a proper manner with gestation. Most of them (59.6) had a thickness that ranged between 36-40 mm at 36 weeks which is within the normal placental maturation.

Table 3: NICU Admission for All Babies (n = 100)

NICU Admission	Frequency	Percentage (%)
Yes	21	21.0
No	79	79.0
Total	**100**	**100**

One-fifth of the entire infants (21 percent) were forced to be admitted to NICU. This makes early detection of placental dysfunction more significant because the babies were forced to undergo support even after delivery was made

Table 4: Placental Thickness vs NICU Admission at 36 Weeks [n = 94(Term Babies)

Placental Thickness	Women (n)	NICU Admission (n)	Percentage (%)
Thin (<31 mm)	11	6	6.3
Normal (31–39 mm)	76	10	10.6
Thick (>39 mm)	7	1	1.1
Total	**94**	**17**	**18.1**

NICU admission rates were highest among babies born to mothers with thin placentas, indicating compromised placental health and reduced fetal tolerance to birth stress. Normal- thickness placentas also showed significant NICU admission rates, suggesting other contributing perinatal factors. Thick placentas contributed minimally to NICU admissions, though rare pathological causes cannot be excluded

DISCUSSION

Placental thickness is an important sonographic parameter reflecting placental growth and function. In the present study, placental thickness increased progressively with gestational age, which is consistent with previous studies.

Abnormal placental thickness was associated with adverse neonatal outcomes including low birth weight, low Apgar scores, and increased NICU admissions. These findings support the role of placental thickness as a useful predictor of fetal well-being.

Several studies in literature have demonstrated a strong correlation between placental thickness and fetal growth. The present study also observed that pregnancies with placental thickness within normal range had better neonatal outcomes compared to pregnancies with abnormal placental thickness.

Routine measurement of placental thickness during third trimester ultrasonography can therefore provide valuable information regarding fetal status and help identify high-risk pregnancies requiring closer monitoring.

CONCLUSION

Ultrasonographic measurement of placental thickness is a valuable, simple, non-invasive, and reproducible tool for assessing placental health and predicting neonatal outcome.

Placental thickness measured during the third trimester shows significant association with neonatal birth weight, Apgar score, and NICU admission. Abnormal placental thickness may indicate increased risk of adverse fetal outcome.

Routine evaluation of placental thickness during antenatal ultrasonography may improve early detection of high-risk pregnancies and enhance perinatal care.

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