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Correlation of Ultrasonographic Placental Grading With Hypertensive Disorders of Pregnancy

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Abstract

Background: Hypertensive disorders of pregnancy are a major cause of maternal and perinatal morbidity and mortality and are often associated with placental insufficiency. Ultrasonographic placental grading provides a non-invasive method for assessing placental maturation and may help identify high-risk pregnancies. This study aimed to evaluate the correlation between ultrasonographic placental grading and hypertensive disorders of pregnancy, and to assess associated fetal outcomes.

Materials and Methods: A prospective comparative study was conducted on 50 pregnant women attending JJMMC Hospital, Davanagere, including 30 cases with hypertensive disorders and 20 normotensive controls. Placental grading was performed using standard ultrasonographic criteria, and fetal biometric parameters and perinatal outcomes were recorded.

Results: Grade III placental maturity was significantly more frequent in hypertensive pregnancies (60%) compared to controls (20%). Premature placental maturation before 37 weeks was observed in 33.3% of hypertensive cases versus 10% of controls, suggesting accelerated placental aging. Early Grade III placenta was associated with adverse fetal outcomes, including intrauterine growth restriction, low birth weight, and intrauterine fetal demise. No significant correlation was found between placental grade and fetal biometric parameters.

Conclusion: Ultrasonographic placental grading is a useful tool for identifying premature placental maturation in hypertensive pregnancies and may help predict adverse perinatal outcomes, enabling closer monitoring and timely obstetric intervention.

Keywords: Hypertension in pregnancy, placental grading ultrasonography, gestational age.

Introduction

Hypertensive disorders represent one of the most frequent complications encountered during pregnancy and are strongly linked to increased maternal and fetal illness and death. Although maternal hypertension affects only about 6–8% of pregnancies, it accounts for nearly 22% of perinatal deaths and approximately 30% of maternal mortality. Pregnancy may lead to the development of hypertension in women who were previously normotensive, and it can also worsen the severity of the condition in those with pre-existing chronic hypertension (Yadav et al., 1997). Pregnancy-induced hypertension is characterized by the onset of elevated blood pressure—defined as readings exceeding 140/90 mmHg—after 20 weeks of

gestation, accompanied by edema, proteinuria, or both. Eclampsia, which includes hypertension, proteinuria, peripheral edema, and neurological complications during pregnancy, signifies a particularly high-risk group among obstetric patients (Corrol, 1980). The placenta is a highly active organ that carries out numerous essential functions during its relatively brief lifespan.

Maintaining placental integrity is vital for normal fetal health, growth, and development. Structural or functional changes in the placenta frequently mirror underlying maternal or fetal disorders, as well as inherent defects arising during placental formation. For this reason, careful prenatal assessment of the placenta is of great clinical importance. Prior to the introduction of ultrasound technology, placental evaluation relied largely on retrospective observations, offering greater insight into neonatal outcomes than prenatal conditions. However, with advances in ultrasound imaging, obstetricians can now assess placental structure and function in detail before birth. This has enabled accurate prenatal identification and differentiation of placental abnormalities while the fetus remains in utero (Jauniaux and Campbell, 1990). Improvements in the interpretation of ultrasound images have significantly enhanced the evaluation of fetal health and developmental maturity. Notably, placental ultrasound features—which undergo continuous structural changes throughout pregnancy—are increasingly being studied as possible indicators of fetal growth and development (Petrucha, Golde and Platt, 1982).

The placenta can first be detected on ultrasound as a localized area of thickening at the edge of the gestational sac around six weeks of pregnancy. By the completion of the first trimester, it appears as a delicate, finely textured, disk-shaped structure covering a large portion of the endometrial lining. Placental thickness continues to increase until approximately the fifth month of gestation (Chiu and Chiu, 1982). The chorionic villi keep growing and maturing throughout pregnancy; however, as term approaches, some villi may undergo degeneration. This process is often accompanied by the accumulation of fibrin-like material due to stagnation and pooling of maternal blood within the intervillous spaces.

PLACENTAL GRADING ON ULTRASOUND

Sonographic signs of placental development can be detected as early as six weeks of pregnancy. At this stage, the placenta appears as regions of increased echogenicity outlining the developing gestational sac. These echogenic areas correspond to the chorion frondosum, which later differentiates into the mature placenta. Clear visualization of placental architecture is generally not achieved until around twelve weeks of gestation. Grannum and colleagues (1979) proposed a grading system based on a longitudinal analysis of placental texture using serial ultrasound examinations conducted over a four-year period. This system categorizes placental maturity into four grades, from Grade 0 to Grade III, based on characteristic sonographic changes observed within three distinct anatomical regions:

1. Chorionic plate
2. Placental parenchyma
3. Basal plate region

Grade 0:

In Grade 0 placentas, the chorionic plate is visualized as a continuous, straight, and clearly demarcated dense line. The placental tissue appears uniform in texture, with no prominent echogenic foci present. Similarly, the basal layer shows a homogeneous appearance and closely resembles the placental parenchyma. This grade is typically observed during the first and second trimesters of pregnancy.

Grade 1:

In Grade 1 placentas, the chorionic plate remains clearly defined and uninterrupted but begins to show mild, wavy contour changes. A small number of dispersed echogenic spots may be seen within the placental tissue, usually measuring about 1–4 mm in length and oriented parallel to the basal layer. This grade is commonly identified between 30 and 32 weeks of gestation and may occasionally persist until delivery.

Grade II:

In this stage, the irregularities of the chorionic plate become more pronounced. Elongated echogenic streaks, often described as comma-shaped densities, are observed within the placental tissue and may extend from the chorionic plate toward the basal layer. These echogenic features are more frequently located

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near the chorionic surface but are typically discontinuous, unlike the uninterrupted patterns seen in Grade III placentas.

The linear echogenic markings previously noted in Grade I remain visible within the placental substance, although they tend to increase in both number and intensity. A defining characteristic of Grade II placentas is the appearance of echogenic linear structures along the basal layer. These basal echogenic densities vary in thickness, have an irregular contour, and are aligned parallel to the long axis of the placenta. In some cases, they are sufficiently dense to produce acoustic shadowing.

Grade III:

In Grade III placentas, the indentations of the chorionic plate continue to be clearly visible. The echogenic areas within the placental tissue that were observed in Grade II remain present, but they often become more prominent in both number and intensity. The defining feature of this grade is the presence of continuous, linear echogenic bands that extend uninterrupted from the chorionic plate to the basal layer. These linear structures are thought to correspond to the intercotyledonary septa responsible for dividing the placenta into individual cotyledons. At times, the central region of a placental lobule may appear relatively echo-poor. Such areas likely represent central portions of the intervillous spaces that lack villi, possibly due to destruction caused by high-pressure maternal arterial blood flow. Large echogenic foci are also frequently observed, typically located near the chorionic surface, and are believed to represent pale, rubbery infarcts on the fetal aspect of the placenta. These findings generally have no clinical relevance unless they are present in large numbers. Additionally, the basal echogenic densities noted in Grade II remain evident in Grade III and may show increased density and frequency.

Materials And Methods

Study design and setting

The present study included a total of 50 pregnant women, comprising 30 cases with hypertensive disorders of pregnancy and 20 cases with uncomplicated pregnancies. All participants were recruited from the Department of Obstetrics and Gynaecology at JJMMC Hospital, Davanagere. A comprehensive clinical history was obtained from each subject, with particular emphasis on gestational age, the presence or absence of pedal edema, headaches, visual symptoms, epigastric discomfort, vaginal bleeding, and any personal or family history of hypertension, pre-eclampsia, or recurrent pregnancy loss. This was followed by a thorough clinical examination conducted according to the standardized proforma.

Each patient underwent routine laboratory investigations, including hemoglobin estimation, bleeding time, clotting time, ABO and Rh blood grouping, blood urea levels, urine routine and microscopic examination, and fasting blood sugar. Additional assessments such as fundoscopic examination, serum creatinine estimation, and 24-hour urinary protein analysis were performed whenever feasible. Ultrasound examinations were performed using a Siemens Sonoline SL–2 scanner equipped with 3.5 and 5.0 MHz transducers. Scanning was conducted with the patient having a moderately distended urinary bladder. Each participant was positioned supine on the examination table, and the abdominal region was exposed from the symphysis pubis to the xiphisternum. A coupling gel was applied to the abdomen to ensure adequate acoustic contact between the transducer and the skin. Initially, a midline sagittal scan of the abdomen was obtained to determine fetal position. This was followed by parasagittal and transverse scans for comprehensive assessment. The biparietal diameter was measured at the level of the parietal eminences, representing the maximum transverse diameter of the fetal skull. Measurement was performed by placing one caliper on the outer margin of the proximal skull table and the second caliper on the inner margin of the distal skull table, ensuring alignment perpendicular to the midline at the widest point.

The scanned section revealed several characteristic features, including

1. An oval-shaped fetal skull,
2. A short midline echo located in the anterior two-thirds of the head,
3. Visualization of the cavum septum pellucidum, and
4. The presence of basal cisterns.

The fetal femur was identified by first obtaining a transverse section of the fetal body and then gradually moving the transducer caudally along the fetal trunk

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until the femoral cross-section was visualized. Once identified, the transducer was rotated to obtain a longitudinal view of the femur, allowing visualization of the entire length of the bone. The diaphyseal length was measured from the midpoint of the U-shaped contour at both ends of the femur. Head circumference and abdominal circumference measurements were performed in cases where discrepancies were noted between the gestational age calculated from the last menstrual period and that estimated using biparietal diameter and femur length. A biophysical profile assessment was conducted whenever clinically indicated**.**

Sample size calculation

The sample size for the present study was 50 pregnant women, selected based on feasibility and availability during the study period. The study included two groups: 30 patients diagnosed with hypertensive disorders of pregnancy (study group) and 20 normotensive pregnant women (control group). The sample size was considered adequate to compare placental maturity patterns and fetal outcomes between the two groups.

Study population

The study population comprised pregnant women attending the Department of Obstetrics and Gynaecology at JJMMC Hospital, Davanagere. Participants were divided into two groups:

- **Study group:** 30 pregnant women diagnosed with hypertensive disorders of pregnancy (including preeclampsia and gestational hypertension).
- **Control group:** 20 normotensive pregnant women with uncomplicated pregnancies.

Inclusion criteria involved pregnant women in the third trimester willing to participate, while those with other significant medical or obstetric complications were excluded.

Study Instrument and Data Collection Procedure

Ultrasonography (USG) was used as the primary diagnostic tool for evaluation. All participants underwent antenatal ultrasound examination prior to delivery.

The following parameters were assessed:

- Placental maturity grading (Grannum classification)
- Fetal biometric parameters:
    - Biparietal diameter (BPD)
    - Femur length (FL)
- Amniotic fluid volume (liquor amnii)
- Fetal heart rate

Clinical and demographic data such as age and parity were recorded. After delivery, fetal outcomes were documented, including:

- Mode of delivery (normal vaginal delivery or cesarean section)
- Birth weight of the newborn
- Live birth or stillbirth

All data were collected systematically using a predesigned proforma.

Statistical Analysis

The collected data were entered and analyzed using appropriate statistical methods. Descriptive statistics such as mean, percentage, and range were used to summarize the data.

Comparative analysis between the study and control groups was performed to evaluate:

- Differences in placental maturity grades.
- Association of placental grading with fetal biometric parameters.
- Relationship between placental maturity and fetal outcomes.

Statistical significance was assessed using suitable tests such as the Chi-square test for categorical variables and Student's t-test for continuous variables. A p-value < 0.05 was considered statistically significant

Results

The present study was conducted on 50 pregnant women, including 30 cases with hypertensive disorders of pregnancy (study group) and 20 normotensive controls, all from the Department of Obstetrics and Gynaecology, JJMMC Hospital, Davanagere. Ultrasonographic evaluation was performed in all cases, including estimation of gestational age using biparietal diameter (BPD) and

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femur length (FL), along with assessment of liquor amnii and fetal heart rate. In terms of parity, primigravida women constituted a higher proportion in the study group (63%) compared to the control group (45%), whereas multigravida women were more common in the control group (55%).

The mean BPD and FL values were slightly lower in cases with Grade III placental maturity in the study group compared to the control group. However, no significant correlation was observed between fetal biometric parameters (BPD and FL) and placental maturity grades on ultrasound. This suggests that although fetal growth parameters may trend lower in advanced placental grades, they are not reliable indicators of placental maturation.

Placental maturity assessment prior to delivery showed that Grade III placenta was significantly more common in the study group (60%) compared to the control group (20%). No cases of Grade 0 placenta were observed at term in either group. Grade I and II placental changes were more frequently seen in the control group, whereas advanced placental maturity (Grade III) predominated in hypertensive pregnancies, indicating accelerated placental aging in these cases.

A notable finding of the study was the increased incidence of premature placental maturation in the hypertensive group. Grade III placental maturity before 37 weeks of gestation was observed in 33.3% of cases in the study group, compared to only 10% in the control group. In contrast, the majority of control cases before 37 weeks showed Grade I placenta, suggesting normal progression of placental maturation. This clearly indicates that hypertensive disorders are associated with early placental aging.

Across different gestational ages, the study group consistently demonstrated a higher proportion of Grade III placental changes compared to the control group. Even beyond 37 weeks, Grade III placenta remained more frequent in the study group, further supporting the presence of accelerated placental maturation in hypertensive pregnancies.

Fetal outcomes were also adversely affected in the study group. There was a higher rate of cesarean section in hypertensive pregnancies, particularly in cases with Grade III placenta, compared to the control group where normal vaginal delivery was more common. Additionally, the birth weight of newborns in the study group was generally lower than that of the control group.

Importantly, early appearance of Grade III placenta (before 37 weeks) was associated with poor fetal outcomes. In the study group, four such cases resulted in low birth weight infants with intrauterine growth restriction (IUGR), and one case resulted in intrauterine fetal demise. These findings highlight a strong association between premature placental maturation and adverse perinatal outcomes. Overall, the study demonstrates that hypertensive disorders of pregnancy are linked with accelerated placental maturation and increased risk of unfavorable fetal outcomes.

Discussion

The present study included 50 pregnant women, comprising 30 cases with hypertensive disorders of pregnancy and 20 normotensive controls, all recruited from a tertiary care center. The demographic profile showed comparable age distribution between both groups, with the majority of participants falling within the 22–24-year age group. A higher proportion of primigravida women was noted in the hypertensive group, which is consistent with the known higher risk of preeclampsia in first pregnancies.

Fetal biometric parameters, specifically biparietal diameter (BPD) and femur length (FL), were observed to have lower mean values in cases associated with Grade III placental maturity in the hypertensive group. However, no statistically significant correlation was established between these parameters and placental grading. These findings are in agreement with the observations of Grannum et al. (1979), who also reported no meaningful association between fetal biometry and placental maturity.

In the control group, placental maturity assessment prior to delivery revealed no cases of Grade 0 placenta. Grade I and Grade II placental maturity were each observed in 40% of cases, while Grade III maturity was seen in 20% of cases. These findings are consistent with previous studies, including those by Grannum et al. (1982), Petrucha and Platt (1982), and Cheema Raj (1992), all of which reported similar distributions of placental grades in normotensive pregnancies.A comparison with earlier literature demonstrates that the prevalence of placental maturity grades in normotensive pregnancies varies widely.

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Reported ranges include 0–1.8% for Grade 0, 5.2–45% for Grade I, 30.6–73.7% for Grade II, and 5–48.7% for Grade III. The findings of the present study fall well within these ranges, further validating its observations. In contrast, the hypertensive study group demonstrated a markedly higher prevalence of advanced placental maturity. Grade III placental changes were observed in 60% of cases, significantly exceeding the proportion seen in the control group. No cases of Grade 0 placenta were identified. These findings indicate an increased occurrence of advanced placental maturation in pregnancies complicated by hypertensive disorders.

The results align with several previous studies, including those by Hills et al. (1984), Cheema Raj (1992), and Agarwal et al. (1987), which reported a higher incidence of Grade III placental maturity in hypertensive pregnancies. Tewari et al. (1997) similarly observed that a greater proportion of preeclamptic patients exhibited advanced placental changes compared to normotensive controls.

However, some studies, such as those by Hill et al. (1983) and Montan et al. (1986), have reported no significant difference in placental grading between hypertensive and normotensive pregnancies. This discrepancy may be attributed to variations in study design, sample size, and population characteristics.

A key finding of the present study is the occurrence of premature placental maturation in hypertensive pregnancies. Grade III placental maturity before 37 weeks of gestation was observed in 33.3% of cases in the study group, compared to only 10% in the control group. This suggests accelerated placental aging in pregnancies complicated by hypertension.

These findings are consistent with earlier reports by Grannum et al., Quinlan et al., and Kazzi et al., who also documented early onset of advanced placental maturity in high-risk pregnancies. Agarwal et al. (1987) further reported that Grade III placenta tends to appear earlier in hypertensive pregnancies compared to uncomplicated cases. The association between premature placental maturation and adverse fetal outcomes was clearly demonstrated in this study. In both groups, early Grade III placental changes were linked to intrauterine growth restriction (IUGR). In the hypertensive group, these cases were also associated with low birth weight and, in one instance, intrauterine fetal demise.

These observations are supported by previous studies, including those by Quinlan et al. (1982), Kazzi et al. (1983), and Froud and Grant (1987), which reported a strong association between early placental aging and adverse perinatal outcomes such as IUGR, low birth weight, and increased perinatal mortality.

Additionally, the study group exhibited a higher rate of cesarean deliveries and overall poorer neonatal outcomes compared to the control group. This reflects the increased obstetric risk associated with hypertensive disorders of pregnancy and highlights the clinical significance of placental maturity assessment. However, contrasting evidence exists, as Montan et al. (1986) suggested that placental grading may not be a reliable predictor of fetal outcome. Despite this, the majority of studies, including the present one, support a meaningful association between premature placental maturation and adverse fetal outcomes, emphasizing its importance in antenatal surveillance.

Conclusion

This study evaluated 50 pregnant women, including 30 with hypertensive disorders and 20 with uncomplicated pregnancies, using ultrasonography to assess placental maturity and fetal biometric parameters. A significantly higher proportion of Grade III placental maturity was observed in the study group, particularly before 37 weeks of gestation, indicating premature placental aging in hypertensive pregnancies. However, no statistically significant correlation was found between placental grading and fetal biometric measurements such as biparietal diameter and femur length.

Early Grade III placental changes were associated with adverse fetal outcomes, including intrauterine growth restriction, low birth weight, oligohydramnios, and intrauterine fetal demise. The study group also demonstrated a higher rate of cesarean deliveries and overall poorer neonatal outcomes compared to the control group, highlighting the clinical importance of placental maturity assessment in managing pregnancies complicated by hypertension.

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biparietal diameter. Chinese Medical Journal, 1985; 98: 561-70.

TABLE

Table 1: Parity Distribution in Study & Control Group

Parity	No. of cases in study	No. of cases in control group
PRIMIGRAVIDA	**19 (63%)**	**9 (45%)**
MULTIGRAVIDA	**11 (36%)**	**11 (55%)**
Total	**30 (60%)**	**20 (40%)**

Table 2 : Biparietal diameter (BPD) in different Placental Grades in Study group

Placental Grades	No. of cases	Av. BPD (in mm)	Range (in mm)
Grade I	**4**	**92.75**	**90-96**
Grade II	**8**	**93.62**	**71-97**
Grade III	**18**	**93.11**	**77-99**

Table 3 : Biparietal Diameter (BPD) in different Placental Grades in Control group

Placental Grades	No. of cases	AV. BPD (in mm)	Range (in mm)
Grade I	**8**	**90.25**	**82.96**
Grade II	**8**	**90.37**	**88-97**
Grade III	**4**	**94.75**	**90-97**

Table 4: Femur Length (FL) in different Placental Grades in Study group

Placental Grands	No. of cases	Av. FL (in mm)	Range (in mm)
Grade I	**4**	**72.0**	**70-74**
Grade II	**8**	**72.8**	**70-75**
Grade III	**18**	**72.13**	**69-75**

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Table 5: Femur Length (FL) in different Placental Grades in Control group

Placental Grades	No. of cases	Av. FL (in mm)	Range (in mm)
Grade I	**8**	**70-125**	**62-74**
Grade II	**8**	**71.87**	**69-74**
Grade III	**4**	**72.5**	**72-73**

Table 6 : Placental maturity grading in Study group before delivery

Gestational age (in wks)	Number of cases	Placental Maturity Grades		
		I	II	III
32	**1**	-	-	**1(100%)**
33	-	-	-	-
34	-	-	-	-
35	-	-	-	-
36	**1**	-	-	**1(100%)**
37	**8**	-	**3(37.5%)**	**5(62.5%)**
38	**11**	**4(36.3%)**	**1(9.0%)**	**6(54.5%)**
39	**8**	-	**3(37.5%)**	**5(62.5%)**
40	**1**	-	**1(100%)**	-
Total	**30**	**4(13.3%)**	**8(26.61%)**	**18(60%)**

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Table 7 : Placental maturity changes in Control group before delivery

Gestational age (in wks	Number of cases	Placental Maturity Grades		
		I	II	III
33	**1**	**1(100%)**	-	-
34	-	-	-	-
35	**1**	**1(100%)**	-	-
36	-	-	-	-
37	**9**	**2 (22.2%)**	**5 (55.5%)**	**2(22.2%)**
38	**7**	**2(28.5%)**	**3(42.8%)**	**2(28.5%)**
39	**2**	**2(100%)**	-	-
Total	**20**	**8(40.0%)**	**8(40.0%)**	**4(20.0%)**

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Table 8 : Showing distribution of Placental Grades on ultrasound examination in relation to gestational age in Study group

Sr. No.	< 37 Wks.		> 37 Wks.	
	Weeks of gestation	Grade	Weeks of Gestation	Grade
1.	**33**	**I**	**39**	**II**
2.	**32**	**III**	-	-
3.	**33**	**I**	**38**	**I**
4.	**31**	**I**	**38**	**I**
5.	**32**	**II**	**39**	**II**
6.	**32**	**I**	**39**	**III**
7.	**36**	**III**	**39**	**III**
8.	**36**	**I**	**38**	**I**
9.	**36**	**I**	**38**	**I**
10.	**36**	**II**	**40**	**II**
11.	**36**	**II**	**39**	**II**
12.	**34**	**II**	**39**	**III**
13.	**34**	**III**	**38**	**III**
14.	**34**	**I**	**38**	**III**
15.	**34**	**II**	**38**	**II**
16.	**34**	**II**	**39**	**III**
17.	**33**	**I**	**38**	**III**
18.	**35**	**I**	**37**	**III**
19.	**31**	**I**	**37**	**II**
20.	**36**	**III**	**37**	**III**
21.	**34**	**II**	**38**	**III**
22.	**36**	**III**	**38**	**III**
23.	**35**	**III**	**39**	**III**
24.	**34**	**III**	**37**	**III**
25.	**34**	**III**	**37**	**III**
26.	**32**	**II**	**37**	**III**
27.	**36**	**III**	-	-
28.	**32**	**0**	**37**	**II**
29.	**33**	**III**	**37**	**III**
30.	**31**	**I**	**37**	**II**

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Table 9 : Distribution of Placental Grades on ultrasound examination in relation to gestational age in Control group

Sr. No.	< 37 Wks.		> 37 Wks.	
	Weeks of gestation	PI. Grade	Weeks of gestation	PI. Grade
1.	**32**	**I**	**37**	**II**
2.	**30**	**0**	**37**	**II**
3.	**35**	**III**	**37**	**III**
4.	**35**	**I**	**38**	**I**
5.	**33**	**I**	**39**	**I**
6.	**33**	**I**	-	-
7.	**35**	**I**	**37**	**III**
8.	**35**	**I**	**39**	**I**
9.	**34**	**0**	**37**	**I**
10.	**32**	**I**	**37**	**II**
11.	**32**	**I**	**37**	**III**
12.	**33**	**I**	**37**	**II**
13.	**33**	**I**	**37**	**I**
14.	**35**	**I**	-	-
15.	**36**	**II**	**38**	**II**
16.	**35**	**I**	**37**	**II**
17.	**35**	**I**	**37**	**I**
18.	**33**	**I**	**38**	**II**
19.	**35**	**III**	**38**	**III**
20.	**34**	**I**	**38**	**II**

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Table 10: Showing Average distribution of Placental Grades in Study group at various gestational ages

Gestation age (in wks.)	Grade 0	Grade I	Grade II	Grade III
31	-	**3(100%)**	-	-
32	**1 (20%)**	**1(20%)**	**2 (40%)**	**1 (20%)**
33	-	**3 (75%)**	-	**1 (25%)**
34	-	**1 (12.5%)**	**4 (50%)**	**3 (37%)**
35	-	**1 (50%)**	-	**1 (50-%)**
36	-	**2 (25%)**	**2(25%)**	**4 (50%)**
37	-	-	**3(33.3%)**	**6 (66.6%)**
38	-	**4(40%)**	**1 (10%)**	**5(50%)**
39	-	-	**3(37.5%)**	**5(62.5%)**
40	-	-	**1 (100%)**	-

Table 11: Showing Average distribution of Placental Grades in Control group at various gestational ages

Gestation age (in wks.)	Grade 0	Grade I	Grade II	Grade III
28	**3 (100%)**	-	-	-
29	**3 (100%)**	-	-	-
30	**4(66. 6%)**	**2(33.3%)**	-	-
31	**2 (50%)**	**2 (50%)**	-	-
32	-	**5 (100%)**	-	-
33	-	**4 (100%)**	-	-
34	**1 (25%)**	**1 (25%)**	-	**2 (50%)**
35	-	**7(77.7%)**	-	**2(22.2%)**
36	-	-	**1(100%)**	-
37	-	**2 (20%)**	**5 (50%)**	**3 (30%)**
38	-	**2 (33.3%)**	**3 (50%)**	**1 (16.6%)**
39	-	**2 (100%)**	-	-

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Table 12: Showing Relationship of ultrasonic Placental maturity with foetal outcome in Study group

Placental Grade	No. of cases	Mode of delivery		Live/stili born		Birth wt. Range
		NVD	LSCS	LB	SB	
Grade I	4	2 (50%)	2 (50%)	4 (100%)	-	2.5-3.25kg
Grade II	8	4(50%)	4 (50%)	8 (100%)	-	2.5-3.0kg
Grade III	18	5 (27.7%)	13 (72%)	17 (94.5%)	1 (5.5%)	1.7-2.25kg

Table 13: Showing Relationship of ultrasonic Placental maturity with foetal outcome in Control group

Placental Grade	No. of cases	Mode of delivery		Live/still born		Birth wt. Range
		NVD	LSCS	LB	SB	
Grade I	8	6 (75%)	2 (25%)	8 (100%)	0	2.75-3.25kg
Grade II	8	7(87.5%)	1 (12.5%)	8 (100%)	0	2.50-3.25kg
Grade III	4	1 (25%)	3 (75%0	4 (100%)	0	1.75-3.0kg

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