Sonographic Placental Grading in 3rd Trimester of Hypertensive Patients

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Abstract:
Mostly poorly controlled hypertensive women have superimposed preeclampsia. In hypertensive pregnancy, the complications occur when the calcification was present in placental. The risk factor of hypertension is placental abruption that may cause premature birth.

Objective:
To determine the placental grading in 3rd trimester of hypertensive patients through sonography.

Methods:
The study design was observational descriptive and the calculated sample size were 125 hypertensive pregnant women at 3rd trimester. The Study was conducted at the Diagnostic Ultrasound Department of The Nawaz Sharif Social Security Hospital, Lahore. All the pregnant hypertensive women at 3rd trimester were included in this study voluntarily. SPSS version 21.0 was used for data analysis.

Results:
All the mothers included in this study were having mean gestational age 34.9±2.33633 weeks. The number of grade II and III in hypertensive pregnant women were 58.4% (73/125) and 41.6% (52/125) respectively.

Conclusions:
Placental maturity grading increase with hypertension. G-II placenta was observed in more hypertensive pregnancies. Hypertension has effected on placental grading in third trimester, with the increases in lower abdominal pain.

Keywords:
Hypertensive mothers, Placental maturity grading, Cotyledons, Basal layer of placenta, Fetal layer of placenta

Introduction
The placenta is an organ joined to the coating of womb amid pregnancy. The placenta is associated with infant by the umbilical string. It keeps unborn infant's blood supply isolate from mother claim blood supply. The placenta creates from the chorionic villi at the implantation site at about the fifth seven day stretch of incubation. Placental structure and function affect the health of the mother, as seen in the development of insulin resistance, preeclampsia, gestational hypertension, and eclampsia. Placental dysfunction affects the fetus, causing prematurity and neuron developmental abnormalities. Pregnancy initiated hypertension (PIH) incorporates Gestational hypertension; Pre-eclampsia and Eclampsia are the most well-known obstetrical complexities. Worldwide around 76,000 pregnant ladies pass on every year from pre-eclampsia and related hypertensive issue. Ultrasound reviewing arrangement of the placenta in light of its development. This essentially influences the degree of calcifications. The grading system is as follows: Placental body is homogeneous in grade 0. Chorionic plate shows small indentations with scattered echogenic foci in grade I. Deeper indentations of chorionic plate (does not reach up to basal plate) shown in grade II. Cotyledons and complete indentations of chorionic plate through to the basal plate was shown in grade III. Placental grade III maturity is associated with placental insufficiency due to chronic hypertension. This may lead to intrauterine growth restriction (IUGR), abnormal fetal growth, fetal distress and hyaline membrane disease. Birth weight depends on the mother's body size and the growth of the placenta. In hypertensive pregnancy, the preterm placental calcifications have adverse effects on uteroplacental blood flow, fetal growth and fetal death. The arteries affected by hypertension which are carrying the blood to the placenta. On the off chance that the placenta doesn't get enough blood then the child may get less oxygen and supplements. This can prompt moderate development, low fetal weight (IUGR). There is a progressive decrease in the mean diameter & surface area of placenta with an increase in severity of pregnancy induced hypertension. The risk factor of hypertension is placental abruption that may cause premature birth. The morphological and histological
changes in the placenta driving component to ischemia because of low course which prompts diminished oxygen supply to the hatchling prompting intrauterine growth restriction (IUGR) contributing to premature birth and fetal death. When sonographers examined the fetal, they also examined the placenta as secondary object. The importance of sonographic examination and documentation of the placenta must be conscious for ultrasound professionals. In two-dimensional ultrasound techniques, the location and perimeters of placenta easily discovered. In three-dimension ultrasound techniques have opened the frontier of placental examination. Placental maturity can be assessed by ultrasound to visualize the changes in placental substance. The placental grades are the amount of calcium deposition.

A study conducted by Lilyan W et al, result in a generally safe obstetric populace, ultrasound recognition of Grannum review III placenta at 36 weeks' growth distinguishes in danger pregnancy. It seems to foresee resulting advancement of protein uric PIH and may help in recognizing the development limited infant. A study conducted by Jeanne et al, that Placental development surveyed by ultrasound has been arranged into 3 reviews by Grannum. Review 3 placental developments previously the 36th seven day stretch of pregnancy is related with unfavorable maternal and fetal morbidity. Deopa study concluded that at the gestational age of 28-31 weeks, Grade II and III placentas in hypertension and IUGR. Placental development increments with gestational age in ordinary and high-chance cases, yet in high-hazard cases placenta develop prior. Vassiliki study concluded that the placental injuries in hypertensive pregnancies, for example, areas of localized necrosis, villous fibrinoid putrefaction, and villous hyper development are essentially associated with hypertension seriousness. Moreover, the placenta vascularization and angiogenesis are altogether poorer when the hypertension level is higher. Ultrasound is very useful and accurate in the visualization of placenta and its maturity grading. If the maturity grading of placenta is timely visualized and properly managed, most of the adverse fetal outcomes will be avoided. The research determined the anticipated outcomes of the pregnancies with maternal hypertension.

**Methods:**
The study design was observational descriptive and the calculated sample size 125 of hypertensive pregnant women during 3\textsuperscript{rd} trimester of pregnancy. Non probability sampling technique was used. The study was conducted at Nawaz Sharif Social Security Hospital, Lahore. All the pregnant hypertensive women at 3\textsuperscript{rd}trimester were included in this study. The outcomes measures were maternal age, blood pressure, headache, vaginal bleeding, lower abdominal pain and ultrasound grading of placental maturity. The ultrasound was performed on NEMIO 10 (TOSHIBA) gray scale machine. The convex transducer was used. The Transducer frequency range was 4.6-6 MHz. As this research followed scientific methods, related information and data was taken from questionnaire scientific journals, internet and books, data collection sheet and lectures. It was gained prior from the Ethical Committee of the University before study. Written informed consent was taken from the patients or their guardian. Patient's identification and details were not published. The pre-tested questionnaire was used to collect data while, Microsoft excel and SPSS Version 21.0 was used to record and analyze the data. Results were presented in the form of mean ± S.D and percentages.

**Results:**
The table 1 showed the total of 125 hypertensive pregnant females taken in this study. The mean ± S.D of maternal age was 27.7±4.3years with minimum and maximum maternal age were 20 and 40 years respectively (table-1).

<table>
<thead>
<tr>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age in years</td>
<td>125</td>
<td>20.00</td>
<td>40.00</td>
<td>27.7440</td>
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<tr>
<td>Table 1: Mean maternal age of hypertensive pregnant females</td>
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</tbody>
</table>

The table 2 showed the mean ± S.D of gestational age was 34.9±2.3 weeks with minimum and maximum were 27 and 39 in weeks respectively (Table 2).

<table>
<thead>
<tr>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational Age in weeks</td>
<td>125</td>
<td>27.00</td>
<td>39.00</td>
<td>34.9040</td>
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<tr>
<td>Table 2: Mean gestational age of hypertensive pregnant females</td>
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</tbody>
</table>

In between 26-28 weeks of gestational ages, 2 pregnant women were presented with grade II and no one with grade III. Between 29- 31 weeks of gestational ages, 3 pregnant women were presented with grade II and 3 with grade III. Between 32-34 weeks of gestational ages, 34 pregnant women were presented with grade II and 9 with grade III. Between
35-37 weeks of gestational ages, 31 pregnant women were presented with grade II and 25 with grade III. Between 38-40 weeks of gestational ages, 3 pregnant women were presented with grade II and 15 with grade III (figure 1).

The table 3 showed the number of grade II and III of placenta in hypertensive pregnant women were 58.4% (73/125) and 41.6% (52/125) respectively (Table 3).

<table>
<thead>
<tr>
<th>Grade</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
<td>II</td>
<td>73</td>
<td>58.4</td>
</tr>
<tr>
<td>III</td>
<td>52</td>
<td>41.6</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>100.0</td>
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Table 3: Frequency of grade II & III of placenta in hypertensive pregnant women

Discussion:
Obstetrical and fetal or neonatal complications were common in pregnancies complicated with hypertensive disorders. Ultrasonic study has shown that the strong echoes detected ultrasonically during antenatal scanning of the placental correspond to deposits of calcium. In the third trimester, placenta might begin to thin and calcify.

The placental grading at third trimester in high risk pregnancies was established from various studies. According to K. M. Sunanda et al., 100 pregnant women with Preeclampsia and 100 normotensive women were included in the study. Majority of the patients were in the age group of 20-25 years (70%). Result of this study, in the control group 33%, 50%, and 17% women had placental grading of I, II and III respectively as against 18%, 56% and 26% in the women in the study group. According to Deopa DD et al., study included 42 cases after 28 weeks of gestation. In 42 cases out of 16 were included in high-
risk pregnancy and 26 were in normal pregnancy. In the study of high-risk cases majority of all cases were of hypertensive group, i.e. 62.5%. At the gestational age of 28-31 weeks, Grade II and III placentas in hypertension and IUGR. Placental development increments with gestational age in ordinary and high-chance cases, yet in high-hazard cases placenta developed prior. Fouedjio JH et al., in a study of Placental development surveyed that ultrasound have been characterized into 3 reviews by Grannum. Review 3 preceding the 36th, seven day stretch of pregnancy was related with unfavorable maternal and fetal grimness. 102 ladies with singleton pregnancies between the 34th and 36th weeks were incorporated. Review 3 placenta represented 5.9% of our sample. According to Daniel McKenna et al. a sum of 1802 patients were checked at 36 weeks of development to decide placental development. Review III placenta at 36 weeks' development was 3.8% (68/1802). The occurrence of protein uric pregnancy-incited hypertension in the investigation and control bunches was 7.4% (5/68) and 1.56% (27/1734), individually. Ultrasound location of a review III placenta at 36 weeks' growth in an okay population distinguished the "at-risk" pregnancy. According to Saliha et al., the impact of hypertension on the development procedure of the placenta which is identified by ultrasonography. 100 pregnant women were included. 50 normotensive and 50 hypertensive ladies were analyzed by ultrasonography at three periods. Initially between 29-32 weeks growth, second between 33-35 weeks and third following 36 weeks till 40 weeks development were included. The result, G II and G III placenta was 27 of 50 (54%) and 2 of 50 (4%) at third trimester. In a study conducted by Afzal E et al., the sample size was 100, in which 50 normal full term placenta and 50 premature placentas from hypertensive mothers were selected. In the placenta of untimely gathering the rate of placental infarcts were expanded. Fetal result was poor within the sight of placental infarcts. Antagonistic perinatal results including development, limitation and still birth was higher in hypertensive untimely conveyances with placental infarcts than in typical full term deliveries.

**Conclusion:**
Hypertension has effected on placental grading in third trimester. The placental maturity grading has increased with hypertension. G-II placenta was observed more in hypertensive pregnancies. Lower abdominal pain had also increased with hypertension.

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17- Fouedjio JH. Associations between the Grade of Placental Maturity at Third Trimester Ultrasound and Maternofetal Outcomes at the Maternity of the Yaoundé Central Hospital: A Prospective Cohort Study.

