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Prevalence of Intrauterine Growth Retardation on Antenatal Ultrasound Scan in Lahore, Pakistan

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ABSTRACT: *Fetal growth retardation is described as infants whose weights are much less than expected. Population based norms are used to categorize abnormal growths. The objective of the study was to determine the frequency of intrauterine growth retardation on antenatal ultrasound scan. It was an observational descriptive study conducted at the Radiology Department of Fatima Memorial Hospital, Shadman Lahore. Patients visited the Ultrasound Department for Obstetric scan. The study was conducted in 6 months from January to June in 2022. The sample size of 87 was calculated for study with expected rate of 9% of pregnancies resulted in intrauterine growth retardation at 5% level of significance at 5% margin of error. The study included pregnant females in third trimesters of pregnancy. The data was analyzed using SPSS version 20. A total of 87 obstetric ultrasounds were performed during the study period. The mean age of the patients was 28.69 ±4.46 years with age range 20-42. The 87 included patients showed mean gestational age 35.29 ±2.50 weeks. The mean biparietal diameter was 8.69±0.57 cm and abdominal circumference was 29.72±3.03 cm. The mean fetal body weight is 2.52±0.59 kg. The frequency of intrauterine growth retardation was 10.3%. Fetal biometry, biophysical profile and Doppler studies were helpful in the diagnosis of intrauterine growth retardation and evaluation of ultrasound parameters in third trimester.*

Keyword: Uterus, Intrauterine, Growth, Fetus, Ultrasound, Retardation

INTRODUCTION

Fetal growth retardation is a problem in which infants have very less weight than the expected. Population based norms are used to categorize abnormal growth (Zavlanos et al., 2021). Therefore, careful assignment of gestational age is crucial to the diagnosis and management of patients with intrauterine growth retardation. The term small for gestational age (SGA) is used to describe a baby whose growth parameters are below 10^{th} percentile for a given gestational age (Alimohamadi et al., 2020; Ashfaq et al., 2022a).

The fetus with reduced physiological growth potential is also called normal small fetus, and has normal umbilical artery Doppler study, normal liquor volume, and no structural abnormality. These babies are symmetrically small and their growth velocity is parallel to the standard curve both prenatally and postnatal (Ashfaq et al., 2022). The small fetuses have no underlying pathology and have normal outcome. Their recognition is important to avoid unnecessary intervention and hospital admission (Berezhna, 2021). The fetus that is small because of intrauterine growth restriction is associated with a small sized placenta with poor supply of nutrients, and with reduced amount of liquor. The baby is thus exposed to the risk of intrauterine death prior to the onset of labor primarily due to hypoxia (Chittaluri et al., 2021; Mubbarka, et al., 2022). The nutrients required for the fetal growth are supplied by the mother through placenta, from where they enter the fetal circulation and are utilized for fetal growth. Three major forms of nutrients are required for fetal growth. These are glucose, amino acids and oxygen. In utero, glucose is burned with oxygen to produce energy in the form of ATP (adenosine triphosphate) (Dap et al., 2022).

Intrauterine growth retardation is a descriptive term for a condition that has numerous potential causes. Determining the specific diagnosis is important for optimal management (Yadav et al., 2020). There are three types of intrauterine growth retardation: asymmetrical intrauterine growth retardation, symmetrical intrauterine growth retardation, and mixed

intrauterine growth retardation (Sujatha et al., 2019). Factors that affect fetal growth are extensive and include maternal, fetal, and placental causes. Maternal and fetal nutritional deficiencies can cause intrauterine growth retardation (Parijatha et al., 2022). Maternal malnutrition is often associated with other socioeconomics factors. Maternal nutritional status before conceiving and inadequate nutrition during pregnancy has a great impact on fetal growth (Kiran et al., 2022). For normal fetal growth an adequate supply of nutrients including oxygen is essential otherwise; inability of the placenta to transfer these nutrients in adequate amounts, or transfer of toxic substances to the baby lead to intrauterine growth retardation. So the poor transfer of nutrients may result from abnormal placental circulation, or when the placental surface area is small (Ndour et al., 2019; Yadav et al., 2020).

The intrauterine growth retardation due to these two fetal causes is usually symmetrical. Chromosomal abnormality and dysmorphic syndrome cause 5% to 15% of intrauterine growth restriction. Approximately 25% of fetuses with early onset symmetrical intrauterine growth restriction may have chromosomal abnormalities. The chromosomal abnormalities associated with early onset (first trimester) intrauterine growth retardation are triploidy and trisomy 13, whereas trisomy 18, 21 and Turner syndrome are associated with relatively late onset (second trimester) intrauterine growth retardation (Mohammad et al., 2018; Borna et al., 2022; Mubbarka, et al., 2022).

The patients with the possibility of intrauterine growth retardation may present with a feeling of small baby in relation to duration of pregnancy, or reduced fetal movements, or on the other hand a vigilant observer (health care provider) notices a fall or no gain in maternal weight, or failure of fundal height (Mohamed et al., 2021; Melissa et al., 2020). Ultrasound scan is the diagnostic tool of choice for intrauterine growth restriction and it should be carried out on every patient being evaluated for intrauterine growth retardation. The ultrasound evaluation

aims at the assessment of fetal growth, diagnosis of congenital malformation, and estimation of liquor volume (McFadyen, et al., 2020; Nazir et al., 2021). The study aimed to evaluate the usefulness of ultrasound parameters on third trimester for detecting intrauterine growth retardation.

MATERIAL and METHODS

Patient information

It was an observational descriptive study conducted at the Radiology Department of Fatima Memorial Hospital, Shadman Lahore. The data off the patients considered that came in the Ultrasound Department for Obstetric scan. The study was conducted in 6 months from January to June in 2022. Sample size of 87 was calculated for study with expected rate of 9% pregnancies resulted in intrauterine growth retardation at 5% level of significance at 5% margin of error. Whereas z = 1.645, e = 5%, P = 9%. The study included pregnant females in third trimesters of pregnancy. Unwilling patients, non-pregnant females, pregnant females in their first and second trimester and patients with some morbidity like bleeding disorders were excluded from the study.

Data analysis

Performa was completed with the information of inclusive individuals. After acquiring consent from the patient and the radiology department, data was collected by filling the structured questionnaire having open and closed ended questions. Information for filling the questionnaire was taken by performing obstetric ultrasound scan of pregnant females in their 3rd trimesters of pregnancy.

STATISTICAL ANALYSIS

The data was analyzed using SPSS (Statistical package for social sciences) version 20. Continuous variables like age were expressed as mean± SD, whereas categorical variable in the form of frequency and percentage.

RESULTS

A total 87 obstetric ultrasounds were performed during the study period. The means age and mean gestational age of the pregnant women

were noticed. Out of 87 patients, minimum age of pregnant women was 20 years while maximum age was 42 years. The mean age of pregnant women was 28.69± 4.46. Minimum gestational age was 27years while maximum gestational age was 40 years. The mean gestational age was 35.29±2.50 (Table 1).

Table 1: Mean age of pregnant women and gestational age

Mean age of pregnant women			
No. of Patients	**Minimum**	**Maximum**	**Mean± SD**
87	20	42	28.69±4.46
Mean gestational age of pregnant women			
87	27	40	35.29±2.50

Table 2 showed the mean of fetal measurements of biparietal diameter, abdominal circumference, femur length, and estimated fetal body weight. Out of 87 subjects, the minimum biparietal diameter was 7.0 while maximum biparietal diameter was 9.6 with mean of 8.69±0.57. The minimum abdominal circumference was 20.52 while maximum abdominal circumference was 35.5 with mean of 29.72±3.03. The minimum femur length was 0.52 while maximum femur length was 7.85 with mean of 6.93±0.54. The minimum estimated fetal body weight was 0.95 while maximum estimated fetal body weight is 3.69 with mean of 2.52±0.59.

Table 2: Mean of Fetal Measurements on ultrasound scan in 87 patients

Parameters	**Minimum**	**Maximum**	**Mean± SD**
Biparietal diameter	7.0	9.6	8.69±0.57
Abdominal circumference	20.52	35.5	29.72±3.03
Femur Length	0.52	7.85	6.93±0.54
Estimated fetal body weight	0.95	3.69	2.52±0.59

Table 3: Frequency of IUGR among pregnant women

Frequency of IUGR among pregnant women	Frequency	Percentage
Yes	9	10.3
No	78	89.7

DISCUSSION

The current study was conducted to evaluate the frequency of IUGR in pregnant women using ultrasonography. Some parameters were taken in the study including biparietal diameter, abdominal circumference, femur length, estimated fetal body weight. The study estimates that abdominal circumference plays a vital role in detecting IUGR. A study done by Waseem et al. 2020 also shows that abdominal circumference has best accuracy for detecting IUGR. The previous study conducted that all parameters of biophysical profile of fetus play an important role in estimating IUGR (Waseem et al., 2020).

According to the current study, 87 pregnant women at third trimester were assessed by antenatal ultrasound to see the frequency of intrauterine growth retardation. Ultrasound is the best, easily available and non-invasive modality for determination of intrauterine growth retardation. Ultrasound was used to determine the fetal biometry including biparietal diameter, abdominal circumference, femur length, estimated fetal body weight and Doppler studies. A study was done by Taha Ismail et al. 2018 in which 77 pregnant females were conducted. The aim of the study was to assess the accuracy of fetal biophysical profile parameters in predicting IUGR. The study concluded that ultrasound is the best modality for diagnosing IUGR in pregnant females. It is a noninvasive, easily available tool for diagnosing IUGR which was completely related to the current findings (Mohammed et al., 2018).

The current study concluded that the frequency of intrauterine growth retardation was 10.3% among 87 patients. The frequency of IUGR is 10% in the study area. A study done by Berezhna et al. 2021 also concluded the same findings that IUGR is seen to be prominent in 10% pregnancies only among all pregnant females (Berezhna, 2021).

CONCLUSION

Fetal biometry, biophysical profile and Doppler studies were found helpful in the diagnosis of intrauterine growth retardation and evaluating the usefulness of ultrasound parameters in third trimester. Antenatal detection improved fetal outcome, reduces stillbirths and construct an effective management plan for risk factors.

ETHICAL APPROVAL

The study was approved by the intuitional ethical review committee.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

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