e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(3); 400-403

Original Research Article

Ultrasonography Foetal Biometric Parameters for the Early Diagnosis of Intrauterine Growth Retardation

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Received: 26-01-2023 / Revised: 28-02-2023 / Accepted: 12-03-2023
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Conflict of interest: Nil

Abstract

Method: A prospective observational research was carried out from 2020 to 2022 in the Obstetrics and Gynecology Department at Katihar Medical College, Katihar. 100 antenatal participants who were chosen from the outpatient department participated in the research. The gestation period for each woman's singleton baby was 28 to 30 weeks.

Result: Uterine Artery doppler S/D Ratio: abnormal (Right 16%, Left 12%), Uterine doppler Artery RI Ratio: abnormal (Right 15%, Left 21%), Uterine doppler ED Notch: 8%, Umblical doppler Artery S/D Ratio: Abnormal 15%, Umblical doppler Artery RI Ratio: Abnormal 19%

Discussion and Conclusion: Additionally useful predictors of IUGR are biometric USG markers, particularly abdominal circumference and its relationship to head circumference and femur length. It has been suggested that uterine Doppler testing during the second or third trimester be used as a screening method for early onset IUGR, particularly that linked to preeclampsia. Ultrasound biometry and Doppler velocimetry was conducted on 100 clinically suspected cases for evaluation of IUGR pregnancy. Standard biometric measurements were used to calculate the EFW, which was then reported as percentiles. Resistance indices, systolic and diastolic ratios, and colour flow and pulse Doppler measurements of uterine umbilical vessels were made. Reviewing maternal and field charts allowed researchers to determine the pregnancy result. The results were analysed using a statistical analysis system.

Keywords: Ultrasonography, IUG, Retardation & Foetal.

Introduction

One of the most significant issues that can arise during pregnancy is intrauterine growth restriction (IUGR). The term "growth-restricted foetus" refers to a foetus that does not develop to its full capacity and is susceptible to negative perinatal outcomes. An intrauterine growth restricted foetus is one whose projected weight is below the 10th percentile for the gestational age at which it is present, according to the American College of Obstetricians and Gynecologists (ACOG) [1]. As it carries the potential for long-term complications throughout life like pneumonia, meconium aspiration hypoglycemia, and some long-term impairments like neurodevelopment disability and cardiovascular disorders, IUGR continues to be a challenging problem in developing countries. It affects nearly 30 million infants each year. In IUGR, perinatal mortality is 3.6% [2]. Insufficient placenta due to maternal conditions like hypertension, renal disease, collagen vascular disease, poor nutrition,

alcohol and substance misuse, viral infections, and foetal chromosomal abnormalities are just a few of the causes of IUGR [3]. According to the definition, 10% must be the total prevalence of IUGR. Three to five percent of moms who are healthy and well-fed experience IUGR. It is 25% or more in cases of hypertension and previously growth-retarded foetuses [4].

A foetus with an expected foetal weight that is below the 10th percentile for gestational age is diagnosed as having foetal growth restriction, also known as intrauterine growth restriction, during an ultrasound. The American College of Obstetrics and Gynecology recommends this classification (ACOG) [1] IUGR has been linked to decreased length and head circumference, loss of adipose tissue and muscle density, as well as decreased organ weights [5].

Material and Methods

A prospective observational study conducted in Department of Obstetrics and Gynaecology in Katihar Medical College, Katihar from 2020 to 2022. The study was conducted with 100 antenatal subjects who were selected from the outpatient Department. All the women had a singleton pregnancy of 28-30 weeks gestation.

Inclusion criteria: Singleton pregnancy with gestational age between 28-30 weeks, women with reliable dating of pregnancy with known LMP.

Exclusion criteria: All subjects with history of rupture of membranes, active labour, multiple pregnancies and fetuses with congenital anomalies.

Methodology of the Study

The subjects enrolled for the study were followed up from the point of recruitment up to the time of delivery. Screening and diagnosis for IUGR includes:

1) Accurate determination of the gestational age.
2) Abdominal palpation of determine fundal height during each antenatal visit.
3) Ultrasound examination of a suspected SGA fetus with color doppler.
4) Assessment of fetal well-being when an SGA fetus or IUGR fetus is diagnosed, includes Doppler studies and cardiotocography monitoring (CTG).

Determining the gestational age accurately by LMP and, if possible, comparing it to the first trimester of USG. If the last menstrual period (LMP) is certain, with regular menstruation, and there is a difference of less than 10 days between the LMP and ultrasound, the LMP estimate has reasonable accuracy if the earliest ultrasound is between 13 and 24 weeks of pregnancy.

Statistical analysis

The Microsoft Excel programme was used to evaluate all of the data. Data collection and compilation were followed by statistical analysis of the data. Calculated and compared with findings from other studies were the sensitivity, specificity, positive predictive value, percentage of false positive results, and negative results.

Results

Table 1: Uterine and umbilical artery Doppler findings of the study population

Doppler Findings			Frequency	Percent
Uterine Artery SD	Right	Normal	84	84
		Abnormal	16	16
		Total	100	
	Left	Normal	88	88
		Abnormal	12	12
		Total	100	
Uterine Artery RI	Right	Normal	85	85f
		Abnormal	15	15

		Total	100	
	Left	Normal	79	79
		Abnormal	21	21
		Total	100	
Umbilical Artery SD		Normal	85	85
		Abnormal	15	15
		Total	100	
Umbilical Artery RI		Normal	81	81
		Abnormal	19	19
		Total	100	
Uterine Artery ED notch		No	92	92
		Yes	8	8
		Total	100	

77% of patients had Vaginal Delivery while 23% of patients had Emergency LSCS. The findings reveal that Uterine Artery doppler S/D Ratio is abnormal (Right 16%, Left 12%), Uterine doppler Artery RI Ratio is abnormal (Right 15%, Left 21%), Uterine doppler ED Notch is 8%, Umblical doppler Artery S/D Ratio is Abnormal 15%, Umblical doppler Artery RI Ratio is Abnormal 19%.

Discussion

In this research group, 77 patients underwent vaginal delivery while 23 cases underwent LSCS, including both elective and emergency deliveries. Biometric findings of the study group, 46 cases having raised HC/AC and 52 cases having low FL/AC ratio stating increased risk of IUGR with sensitivity of 17.8% and specificity of 61.0% and sensitivity of 64.9% respectively as per shown in table 11 which is comparable to the study conducted in 2017 which were 70% sensitivity and 65% specificity and in similar study of OttWJ 2002 which were 85% sensitivity and 52% specificity respectively. Patient distribution based on average baby weight, apgar score, and NICU admission [6] and gestational age at birth.

The effect of biosocial and physiological factors of the study group. Parity, socioeconomic status and liquor status are insignificant to the IUGR. And NICU admissions, low birth weight having p value <0.05 stating strong significance with incidence of IUGR. Biometric parameters HC/AC and FL/AC ratios having p value < 0.05 showing strong significance with incidence of IUGR. Hence USG considered as good predictor of IUGR. Similar relevance found by Gangadhar P Y et al [7], North at al [8] and Bower et al [9,10].

Conclusion

Additionally useful predictors of IUGR are biometric USG markers, particularly abdominal circumference and its relationship to head circumference and femur length. It has been suggested that uterine Doppler testing during the second or third trimester be used as a screening method for early onset IUGR, particularly that linked to preeclampsia. For the assessment of IUGR pregnancy, 100 clinically suspected cases underwent ultrasound biometry and Doppler velocimetry. Standard biometric measurements were used to calculate the EFW, which was then reported as percentiles. Resistance indices, systolic and diastolic ratios, and colour flow and pulse Doppler measurements of uterine umbilical vessels were made. Reviewing maternal and field charts allowed researchers to determine the pregnancy result. The results were analysed using a statistical analysis system.

References

1. Ismail MT, Hussein AM, Allam HAB,

Mohammed RM. Assessment of accuracy of three ultrasound methods for prediction of intrauterine growth restriction. The Egyptian Journal of Hospital Medicine. 2018;71(2):2505-11.
2. Raghupathy R, Al-Azemi M, Azizieh F. Intrauterine growth restriction: cytokine profiles of trophoblast antigen-stimulated maternal lymphocytes. Clin Dev Immunol. 2012; 2012: 734865.
3. Meyberg R, Boos R, Babajan A, Ertan AK, Schmidt W. Intrauterine growth retardation--perinatal mortality and postnatal morbidity in a perinatal center. Z Geburtshilf Neonatal. 2000 Nov-Dec; 204(6):218-23.
4. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY editors. Textbook of Williams Obstetrics. USA: McGraw Hill books Ltd; 2010.
5. Brar HS, Platt LD. Reverse end-diastolic flow velocity on umblical artery velocimetry in high – risk pregnancies: An ominous finding with adverse pregnancy outcome: Am J Obstet Gynecol: 1998; 159:559-61.
6. Ott WJ. Diagnosis of intrauterine growth restriction: comparison of ultrasound parameters. Am J Perinatol. 2002;19(3):133-7.
7. Gangadhar P Y et al Int. J. Reprodc ontrcept Obstet Gynecol. 2018 Feb. 7 (2):596.
8. North RA, Ferrier CL long D, Townend K, Kincaid-smith F, Uterine artery Doppler flow velocity waveforms in the second trimester for the prediction of pre-eclampsia and fetal growth retardation. Obstet Gynaecol1994;83;378-86.
9. Bower S, Bewlysusan, Campbell S. Improved prediction of pre-eclampsia by two stage Preeclampsia of uterine arteries using the early diastole notch and color Doppler imaging. Obstet Gynecol. 1993;82;78-83.
10. D.G B., & D. B. M. 21st Century Discoveries in the Physiology of Adaptation and Dramatic Changes in the Validation of Substance Dependence. Journal of Medical Research and Health Sciences, 2022;5(12): 2368–2374.