

Evaluation of Fetal Outcome by USG Colour Doppler in Patients of PIH and IUGRSangita Jain¹, Sulekha Kumari², Rashmita³¹Assistant Professor, Department of Obstetrics and Gynecology, Icare Institute Of Medical Sciences & Research & Dr B C Roy Hospital, Haldia, West Bengal, India²Assistant Professor, Department of Obstetrics and Gynecology, Shri Ramkrishna Institute of Medical Sciences and Sanaka Hospital, Durgapur, West Bengal, India³Assistant Professor, Department of Obstetrics and Gynecology, Shri Ramkrishna Institute of Medical Sciences and Sanaka Hospital, Durgapur, West Bengal, India

Received: 18-05-2023 / Revised: 10-06-2023 / Accepted: 11-08-2023

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Conflict of interest: Nil

Abstract**Background:** Hypertensive disorders and intrauterine growth restriction are common complications encountered during pregnancy. This study was conducted to observe the usefulness of systolic/ diastolic (S/D) ratio in umbilical artery to predict perinatal outcome in pregnancies complicated with hypertensive disorders and intrauterine growth restriction (IUGR).**Methods:** It was a prospective observational which was conducted on patients undergoing at Department of Obstetrics and Gynecology, Icare Institute of Medical Sciences & Research & Dr B C Roy Hospital, Haldia, West Bengal, India for one year. All patients were subjected to umbilical artery Doppler velocimetry waveform on weekly basis or every third day.**Results:** Out of 100 patients, 42 patients (42%) had PIH and 32 (32%) had IUGR. 26 cases (26.9%) had both PIH and IUGR. Among the 100 patients, 60 patients (42.9%) of the patients had abnormal doppler. Abnormal doppler were associated with APGAR score of less than 7 at 5 minutes in the newborn. Abnormal perinatal outcome was more in abnormal doppler than normal doppler and the finding was statistically significant ($p < 0.05$).**Conclusions:** Overall sensitivity and diagnostic accuracy of Doppler is better to detecting adverse perinatal outcomes.**Keywords:** Colour doppler, PIH, IUGR.

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Introduction

Pregnancy induced hypertension (PIH) – major cause of maternal and perinatal mortality and morbidity worldwide Cause of 24% of all maternal mortality in developed countries and 20% in developing countries. [1] Early detection of PIH allows vigilant antenatal surveillance and appropriate intervention to avoid serious sequelae. Good utero-placental circulation is essential to achieve normal pregnancy FGR – complex multifactorial condition affecting 3-10% of all pregnancies FGR is associated with an increased risk of perinatal mortality, morbidity and impaired neurodevelopment Colour doppler so helps in detecting these abnormal vascular resistance patterns. [2] The important issue is not the identification of small fetus but rather the “fetus at-risk” for compromise and timely intervention. The challenge is to identify FGR from constitutional small fetus. Accurate diagnosis of FGR is essential

for early detection and proper antenatal management reduces perinatal mortality and morbidity. [3] Umbilical and middle cerebral artery velocimetry is a good predictor of growth restricted fetus. The brain of a normally developed fetus has low vascular impedance with continuous flow throughout cardiac systole. Late onset of placental insufficiency is commonly associated with redistribution of blood flow in favour of fetal brain (i.e. brain sparing phenomena).

Antepartum recognition of pregnancies with an increased risk of adverse perinatal outcome continues to be a major challenge in obstetric practice. Goals of antepartum surveillance programme include early detection of fetal compromise, prevention of unnecessary premature delivery and avoidance of intrauterine death. Hypertensive disorders during pregnancy are the most common medical complications encountered

and their incidence in India is 7-10% of all pregnancies.[4] It has also been found to be a very common cause of intrauterine growth restriction. Apart from history and clinical examination, various noninvasive methods like biochemical parameters, ultrasound and Doppler flow studies give us vital information regarding fetal well-being. Doppler study of uteroplacental circulation, was suggested as the method of pregnancy assessment by Campbell and colleagues⁹ who observed that Doppler flow velocity was abnormal in pregnancies complicated by PIH and IUGR. It appears that, changes in umbilical vessels may precede by many weeks the changes currently detectable by physical examination, electronic fetal heart rate monitoring and perception of diminished fetal movements.[5]

Aim: Aim of the study was to assess fetal Doppler velocimetry waveform in patients with hypertensive disorders in pregnancy and IUGR.

Objectives: Objectives of the study were to study fetal Doppler indices in patient with hypertensive disorders in pregnancy and/or IUGR. to study in patient with hypertensive disorders in pregnancy and/or IUGR, to assess neonatal outcomes in patients of hypertensive disorder in pregnancy and/or IUGR and the result of fetal doppler in prediction of perinatal outcome.

Material and Methods: It was a prospective observational which was conducted on patients undergoing at Department of Obstetrics and Gynecology, Icare Institute Of Medical Sciences & Research & Dr B C Roy Hospital, Haldia, West Bengal, India for one year.

Inclusion Criteria:

- Primigravida / multigravida with viable singleton pregnancy.
- Woman with definite LMP with 3 previous regular menstrual cycles.

Age	Control Group		Study Group	
	No.	%	No.	%
19-20 years	16	40.0	8	13.3
21-25 years	20	50.0	18	30.0
26-30 years	4	10.0	34	56.7
Total	40	100.0	60	100

Majority of women in age group 21-25 years in control group and 26-30 years in the study group.

Discussion

Although Doppler studies of the ductus venous, middle cerebral artery, and other vessels have some prognostic value for IUGR fetuses, currently there is a lack of randomized trials showing benefit.

The UA PI can be used to identify IUGR per se, which is contrary to our study, where we found S/

- Uncomplicated pregnancy not associated with any high risk factor.
- Gestational age corresponding to per abdomen findings.
- Woman and/or her legally acceptable representative willing to provide voluntary written consent for participation.

Exclusion Criteria:

- Woman with multiple gestations.
- Woman and/or her legally acceptable representative not willing to provide voluntary written informed consent for participation.
- Grouping.
- Group S (N=60): Woman with PIH with/without IUGR.
- Group C (N=40): Control Group (without PIH) with/ without IUGR.
- Outcome Measures.
- Fetal weight.
- Apgar Score (1 min, 5 min).
- Admission to NICU.
- Perinatal Morbidity.
- Perinatal Outcome.
- Doppler parameters – RI, PI and S/D Ratio for Umbilical Artery and Middle Cerebral Artery.

Methodology:

- Voluntary written informed consent obtained.
- Woman underwent Doppler study using (Name of machine).
- Waveforms were analyzed for RI, PI and S/D ratio.
- Any increased resistance, AEDF and/or REDF in uteroplacental blood flow were noted Method of Data Collection.
- Customized proforma designed for study purpose and observational method.

Results

D ratio of umbilical artery to be able to identify. Systolic/diastolic (S/D) ratio had sensitivity of 60%, [6] while in our study the sensitivity was slightly higher (74%).

Doppler velocimetry of the uterine arteries reveals a progressive decrease in impedance with advancing gestational age. This decrease in impedance is thought to reflect a maternal adaptation to pregnancy resulting from trophoblastic invasion of the maternal spiral

arterioles in the first half of gestation. The uterine artery can be demonstrated by color Doppler velocimetry as it originates from the anterior division of the hypogastric artery, and just before it enters the uterus at the uterine-cervical junction. [7] Pulsed Doppler velocimetry of the uterine artery should be obtained immediately after the vessel crosses the hypogastric artery and before it divides into the uterine and cervical branches. The ability to obtain the uterine artery Doppler waveforms at all gestational ages is approximately 95-98%. [8]

High risk pregnancies are those where the mother, fetus or the neonate is at increased risk of mortality or morbidity. Pregnancy induced hypertension and intrauterine growth restriction are leading causes of perinatal mortality and morbidity. [9] The role of the obstetrician lies in its timely diagnosis and necessary intervention for which apart from clinical acumen, reliable diagnostic modalities are required. The decision for the timely intervention of pregnancy is based on the overall clinical presentation and specific end points of fetal testing such as abnormal fetal heart rate, doppler studies. [10]

Age and Gravida

In this study most of the patients (83.6%) were between 19-29 years age group. This reflects the reproductive span of women with maximum fertility and therefore association with risk factors like PIH and IUGR in this age group. When distribution of patients according to gravida was studied, it was found that most of the patients were primigravida (54.3%) and we are aware that PIH has a known association with primigravida. So, this group is more vulnerable to obstetric complications. Similar finding was observed in the study by Kumari et al where PIH was common among pregnant women under 25 years. [11] As reported by Zibaenazhad et al primigravida less than 20 years and all patients over 30 years have an increased chance of hypertension. [12] Sheraz et al also reported the same finding and stated that preeclampsia is more frequent in patients younger than 21 years of age and in older than 35 years. [13]

Pregnancy Induced Hypertension

PIH was the most common risk factor found in 96 (68.5%) of patients in this study. In our patients of PIH, it was found that 40 out of 96 patients (41.66%) had abnormally increased waveform indices in umbilical artery, two cases had absent end diastolic flow and one had reverse end diastolic flow. These observations are in close agreement with findings of Fleischer who reported S/D ratio more than 2.6 in the umbilical artery after 26 weeks in cases of PIH with impaired perfusion. [14]

Conclusion

IUGR was higher in patients with PIH (76.6%) in comparison to the control group (50.0%). Only 76.7% patients with PIH had an apgar of > 7, while all control group patients had apgar of > 7. 28 (46.6%) neonates needed NICU support and 1 neonate expired, while 100% of control group neonates were shifted to mother.

In both control and study groups weight of IUGR babies was significantly lower in comparison to their non-IUGR counterparts (by USG and actual). Pregnancies with either hypertensive disorders or IUGR or with both hypertensive disorders and IUGR at Netaji Subhas Medical College and Hospital. PIH and IUGR was more common among the age group 19-24 years in nearly 50% of cases. On stratification, IUGR was common among 25-29 age group, hypertensive disorders and combined hypertensive disorders +IUGR in 19-24 age group. Mean age of the patients was 25 years. Since the above risk factors were common in younger age group and so it was common among primigravida in more than 50% of cases. PIH was the most common among the risk factors in more than one third of cases. In the cases showing absent or REF end diastolic flow in the umbilical artery there is much higher risk of perinatal morbidities and mortalities. Such cases should be terminated as soon as the maturity of the foetus is achieved to prevent perinatal mortalities. Thus, Doppler study has promising capacity to identify poor perinatal outcome, identifying fetuses at risk for developing IUGR, intrapartum asphyxia, intrauterine fetal death and those who may require caesarean delivery. A robust study with a better methodology and larger sample size is required for further understanding.

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