Original Research Article

Evaluation of doppler use in the diagnosis of pregnancy induced hypertension: Hospital based prospective study

Jino Justin J

Assistant Professor, Department of Radiodiagnosis, Kanyakumari Government Medical College, Asaripallam, Tamil Nadu, INDIA.
Email: jinojustinj@gmail.com

Abstract

Background: Evaluate the role of Doppler in routine ultra sonographic examination in cases with pregnancy induced hypertension. **Methods:** This study was conducted in Department of Radio diagnosis, RMMCH. Study period was one year. The pregnant women coming to radiology department was randomly selected during the study period (Sept 2012-Sept 2013). A total of 50 pregnant women were included in the study based on inclusion and exclusion criteria. The study population subjected to color Doppler scan. The data was analyzed with Microsoft Excel. **Results:** Maximum number of patients aged between 26-30 years (n=34). 21 showed changes in uterine artery SD ratio. 32 pregnant women's showed both umbilical and uterine arteries abnormalities. **Conclusions:** Color Doppler major tool in the diagnosis of complications associated with pregnancy induced hypertension.

Key Words: Hypertension, blood flow, color Doppler, pregnancy, umbilical artery, uterine artery.

***Address for Correspondence:**
Dr. Jino Justin J, Assistant Professor, Department of Radiodiagnosis, Kanyakumari Government Medical College, Asaripallam-629201, Tamil Nadu, INDIA.
Email: jinojustinj@gmail.com
Received Date: 16/08/2019 Revised Date: 12/09/2019 Accepted Date: 09/10/2019
DOI: https://doi.org/10.26611/10131228

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 07 November 2019

INTRODUCTION

Hypertensive in pregnant women can cause the maternal and fetal abnormities. Studies showed that a total of 8.23% of perinatal mortality in developed countries. It is higher (35 %) in developing countries[1,3]. During the pregnancy period blood circulation should reach the requirements of the growing fetus. As days progress the nutritional requirements also increases. There is a requirement of change in uteroplacental and fetoplacental circulation to reach fetal requirements and normal pregnancy outcome[4]. Timely investigation of fetal compromise by tests of fetal surveillance is very important.[5-7] Color Doppler is one of the important tool used in the radiology to diagnosis various diseases. With the use of color Doppler its possible for early detection of fetuses at risk during pregnancy associated with hypertension.[8,9] The present study conducted to evaluate the role of color Doppler in the diagnosis of complications associated with pregnancy induced hypertension.

MATERIALS AND METHODS

Design and Study settings

The study was conducted in Department of Radio diagnosis, RMMCH, Tamil Nadu and the study period was one year (Sept 2012-Sept 2013).

Inclusion criteria

- Age between 25-35 years
- 28 weeks of gestational age
- Pregnancy induced hypertension

Exclusion criteria

- Cases less than 28 weeks of gestational age
- Twins

How to cite this article: Jino Justin J. Evaluation of doppler use in the diagnosis of pregnancy induced hypertension: Hospital based prospective study. *MedPulse – International Journal of Radiology.* November 2019; 12(2): 85-87.
http://www.medpulse.in/Radio%20Diagnosis/

- Multiple pregnancy
- Pregnancy associated with other complications

Procedure

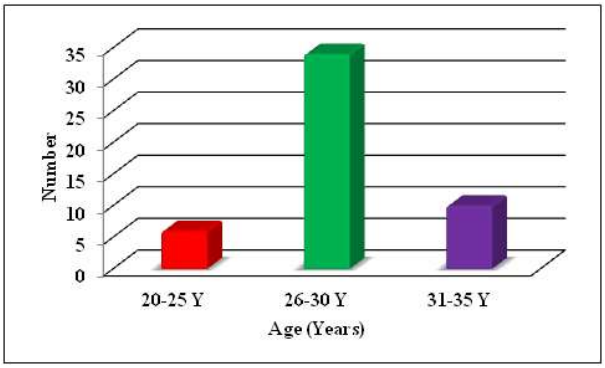
50 cases were selected who were coming for the USG abdomen scan during pregnancy period. Before starting the study procedure all the pregnant women's were explained study procedure and informed consent was obtained. 50 cases were having pregnancy induced hypertension as diagnosed by consultant gynoecologists of concerned cases as per standard protocols. All included cases were subjected to color Doppler. Three major arteries' flow velocities (Umbilical, maternal uterine and fetal middle cerebral artery) were evaluated with color Doppler. Umbilical artery Flow velocity ratio of systolic/diastolic (S/D ratio)>/= 3, uterine artery S/D ratio >/=2.6, Fetal MCA Pulsatality Index (PI) more than 95th centile and less than 5th centile corresponding to gestational age were taken as abnormal. All pregnant women demographic and scan data were recorded and analyzed.

Statistical analysis

The data was expressed in number, percentage, mean and standard deviation. Statistical Package for Social Sciences (SPSS 16.0) version used for analysis. P value less than 0.05 ($p<0.05$) considered statically significant at 95% confidence interval.[10]

RESULTS

Total 50 pregnant women's with hypertension were included in this study. Maximum were age between 26-30 years (n=34) and 6 with age between 20-25 years. Only 10 had age between 31-35 years (Graph-1). 42% cases showed uterine artery SD ratio abnormality. 16 pregnant women showed changes in middle cerebral artery (Table-1). 64% showed abnormalities in umbilical and uterine arteries (Table-2).



Graph-1: Distribution of patients based on the age

Table-1: Evaluation of three different arteries

Observation	Number	Percentage (%)
Umbilical artery SD ratio	13	26.00
Uterine artery SD ratio	21	42.00
Middle cerebral artery	16	32.00
Total	**50**	**100.00**

Table 2: Evaluation of normal and abnormal arteries

Observation	Number	Percentage (%)
Both Umbilical and Uterine arteries	32	64.00
Umbilical, uterine and middle cerebral arteries	18	36.00
Total	**50**	**100.00**

DISCUSSION

Pregnancy induced hypertension is a most common complication during pregnancy period. Use of color Doppler in OBG department allows studying the changes in uteroplacental and fetoplacental circulation in adverse conditions like pregnancy induced hypertension and other complications. By serial Doppler studies, we can follow the sequence of changes in response to fetal hypoxemia and other growth changes in foetus. In the present study 50 were having clinically diagnosed pregnancy induced hypertension. Incidence of abnormal velocimetry in umbilical artery, uterine artery and fetal middle cerebral artery were significantly high in cases with pregnancy associated with hypertension compared to antenatal cases without PIH. Umbilical artery velocimetry associates with hemodynamic changes in the fetoplacental circulation. With increase in number of tertiary stem villi and arterial channels, fetoplacental compartment develops and the impedance in the umbilical artery decreases can leads to complications. From 18 weeks of gestation umbilical artery resistance declines and the diastolic component appears in the waveform during early 2nd trimester. Study done by Fleisher et.al showed about 40% of hypertensive pregnancies have increased resistance in the umbilical arteries and uterine arteries[11]. Thaleret.al evaluated 140 hypertensive pregnant women out of them 27.80 percent had increased changes in SD ratio in both umbilical and uterine artery[12]. In the present study also 25.00% increased SD ratio was observed. Thusharet.al study showed similar observation in fetal middle cerebral artery PI values like present study[13]. Evaluation of these three arteries plays major role in the evaluation of pregnancy induced hypertension and it's fetal out come. Regular color Doppler check up is advised women are diagnosed with pregnancy induced hypertension.

CONCLUSION

The study results it conclude color Doppler of feto-maternal circulation in all cases of pregnancy induced

hypertension is highly useful for early identification of possibilities of fetal complications associated with PIH.

REFERENCES

1. Schulman H, Gleischer A, Stern W, *et al*. Umbilical wave ratios in human pregnancy. Am J. ObstetGynecol 1984; 148: 985-990.
2. Baltaglia C, Artini PA, Galti G, *et al*. Absent or reverse and diastolic flow in umbilical artery and severe intrauterine growth retardation. ActaObstetGynecolScand 1992; 72: 167-171.
3. Mason GC, Lilford RJ, Proter J, *et al*. Randmised comparison of routine versus highly selective use of doppler ultrasound in low risk pregnancies. Br. J ObstetGynecol 1993; 100: 130-133.
4. Newnham JP, O'Dea MRA, Reid KP, *et al*. Doppler flow velocity waveform analysis in high risk pregnancies: a randomized controlled trial. Br. J. ObstetGynecol 1991; 98: 956-963.
5. Mason GC, Lilford RJ, Proter J, *et al*. Randmised comparison of routine versus highly selective use of doppler ultrasound in low risk pregnancies. Br. J ObstetGynecol 1993; 100 : 130-133.
6. Zeeman GG, Dekkor GA: Pathogenesis of preeclampsia: a hypothesis. ClinObstetGynecol 1992; 35: 317-337.
7. Zeeman GG, Dekkor GA: Pathogenesis of preeclampsia: a hypothesis. ClinObstetGynecol 1992; 35 : 317-337.
8. Newnham JP, O'Dea MRA, Reid KP, *et al*. Doppler flow velocity waveform analysis in high risk pregnancies : a randomized controlled trial. Br. J. ObstetGynecol 1991; 98 : 956-963.
9. Rosiane MS, Caio ACP, Edward AJ, Geraldo D, Silvana MQ. Maternal uterine artery in the first and second trimesters as screeing method for hypertensive disorders and adverse perinatal outcomes in low-risk pregnancies. ObsteteGynecolSci 2016;59(5):347-56.
10. Maler J, Manor D, Itskovitz J, *et al*. Changes in uterine blood flow during human pregnancy. Am J ObstetGynecol 1990; 162: 121-125.
11. Fleischer A, Schulman H, Farmakides G, Bracelo M, Grunfeld L, Rolchelson B, *et al*. Uterine artery Doppler velocimetry in pregnant women with hypertension. Am J Obstet Gynecol. 1986;154:806–813.
12. Tushar P, Amit C, Shah. Doppler analysis in pregnancy induced hypertension. JEMDS 2014;71(3):15120-47.
13. Nevo O, Thaler I, Shik V, Vortman T, Soustiel JF. The effect of isosorbidedinitrate , a donor of nitric acid, on maternal cerebral blood flow in gestational hypertension and preeclampsia. American Journal of Obstetrics and Gynecology. 2003;188:1360–1365.

Source of Support: None Declared
Conflict of Interest: None Declared