

Assessment of effectiveness of Doppler in Patients with Pregnancy Induced Hypertension

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Abstract

Background: Hypertensive disorder of pregnancy is a major cause of maternal and perinatal morbidity and mortality in developing countries. The obstetrical use of Doppler sonography for monitoring high-risk pregnancies is today an indispensable procedure. Hence; the present study was conducted for assessing the effectiveness of Doppler in Patients with Pregnancy Induced Hypertension. **Materials & methods:** A total of 20 pregnant patients between 28 to 36 weeks of pregnancy clinically diagnosed as PIH. Control group comprised of 20 patients with 28 to 36 weeks with no clinically detectable hypertension. **Inclusion criteria** Comprised of patients with rise of at least 30 mm Hg and 15 mm of Hg in systolic and diastolic pressures respectively over the previous known blood pressure, patients whose previous blood pressures were not known, the blood pressure of at least 140/90 mm of Hg were considered abnormal, singleton pregnancy, regular periods and normotensive pregnant patients with gestational age between 28 to 36 weeks of gestation. Blood pressure was recorded and ultrasound examination was done followed by Doppler. All the results were recorded and analysed using SPSS software. **Results:** A total of 20 patients were included in the study group and 20 subjects were enrolled in the control group. In the study group, normal S/D ratio was seen in 12 subjects while abnormal was seen in 8 subjects. Among the subjects with abnormal S/D ratio, still birth and low birth weight were seen in 4 subjects and 3 subjects respectively. **Conclusion:** Doppler velocimetry is useful in distinguishing the serious patients from those where the approach can be a bit more conservative.

Key words: Doppler, Pregnancy induced hypertension

INTRODUCTION

Hypertensive disorder of pregnancy (HDP) is a major cause of maternal and perinatal morbidity and mortality in developing countries. HDP is considered to be the result of abnormal placenta formation, involving abnormal trophoblast invasion of spiral arteries leading to an increase in vascular resistance in the uteroplacental circulation. Subsequently, intrauterine growth restriction (IUGR) occurs if there is no intervention.¹⁻³

Hypertension in pregnancy is said to occur when the systolic blood pressure is greater than 140 mmHg and diastolic blood pressure is greater than 90 mmHg on at least two occasions, six hours apart. Hypertensive disorder of pregnancy encompasses gestational hypertension in pregnancy (hypertension without proteinuria), pre-eclampsia (hypertension with proteinuria) and eclampsia (pre-eclampsia with convulsions). In our environment, it is estimated that 5–10% of pregnancies are complicated by hypertensive disorders.⁴⁻⁶

The obstetrical use of Doppler sonography for monitoring high-risk pregnancies is today an indispensable procedure. Meta-analysis shows that a significant reduction in perinatal morbidity and mortality in cases of high-risk pregnancy can be achieved by employing Doppler sonography, in comparison with the routine use of the cardiotocogram and ultrasound biometry.⁴⁻⁷ Hence; the present study was conducted for assessing the effectiveness of Doppler in Patients with Pregnancy Induced Hypertension.

MATERIALS & METHODS

The present study was conducted for assessing the effectiveness of Doppler in Patients with Pregnancy Induced Hypertension. A total of 20 pregnant patients between 28 to 36 weeks of pregnancy clinically diagnosed as PIH. Control group comprised of 20 patients with 28 to 36 weeks with no clinically detectable hypertension. Inclusion criteria Comprised of patients with rise of at least 30 mm Hg and 15 mm of Hg in systolic and diastolic pressures respectively over the previous known blood pressure, patients whose previous blood pressures were not known, the blood pressure of at least 140/90 mm of Hg were considered abnormal, singleton pregnancy, regular periods and normotensive pregnant patients with gestational age between 28 to 36 weeks of gestation. Blood pressure was recorded and ultrasound examination was done followed by Doppler. All the results were recorded and analysed using SPSS software.

RESULTS

A total of 20 patients were included in the study group and 20 subjects were enrolled in the control group. In the study group, normal S/D ratio was seen in 12 subjects while abnormal was seen in 8 subjects. Among the subjects with abnormal S/D ratio, still birth and low birth weight were seen in 4 subjects and 3 subjects respectively.

Table 1: Uterine artery (PIH) s/d ratio and its correlation with fetal outcome

Variable	S/D ratio	Total	Still birth	Low birth weight	Normal birth weight
Study	Normal	12	1	2	9
	Abnormal	8	4	3	1
Control	Normal	20	0	0	0
	Abnormal	0	0	0	0

DISCUSSION

Pregnancy-induced hypertension (PIH) is a syndrome of hypertension with or without proteinuria and edema. It is a major complication of pregnancy.¹ PIH encompasses gestational hypertension, pre-eclampsia (PET) and eclampsia.² PET/eclampsia causes 50,000 maternal deaths worldwide annually, complicating 0.91% of all deliveries in a tropical centre. Blood flow velocity is directly related to peripheral vascular resistance and there are changes in downstream resistance of the renal artery in PIH.⁶⁻¹⁰ Hence; the present study was conducted for assessing the effectiveness of Doppler in Patients with Pregnancy Induced Hypertension.

In the present study, a total of 20 patients were included in the study group and 20 subjects were enrolled in the control group. In the study group, normal S/D ratio was seen in 12

subjects while abnormal was seen in 8 subjects. H Joernet al performed Doppler examinations of the umbilical artery, both uterine arteries, and the fetal middle cerebral artery in the third trimester in 18 patients with pregnancy induced hypertension, 52 patients with preeclampsia, and 32 patients with HELLP syndrome and the results were correlated with the parameters fetal outcome. For 74% of the patients this was the first pregnancy, in 93% of the cases a cesarean section was necessary; 66% of the newborn babies were dystrophic and 90% of them were born prematurely. The blood flow in one uterine artery was restricted in 95% of all 102 pregnant women, only 5% did not show any pathological findings. A pathological blood flow was observed on Doppler sonography in the umbilical artery in 70% of the group and 39% showed a pathologically increased perfusion of the fetal middle cerebral artery. The average birth weights and gestational ages in the study group were markedly reduced in comparison with healthy pregnant women (pregnancy induced hypertension: 1620 g/35 weeks; preeclampsia: 1660 g/34 weeks; HELLP syndrome: 1160 g/31 weeks, respectively). The lowest values for average birth weight and gestational age occurred when all four investigated blood vessels showed pathological Doppler findings: 1180 g/31 weeks (0 to 1 pathological vascular findings: 2780 g/38 weeks; 2 pathological vascular findings: 1845 g/34.5 weeks; 3 pathological vascular findings: 1330 g/31 weeks).¹¹

In the present study, among the subjects with abnormal S/D ratio, still birth and low birth weight were seen in 4 subjects and 3 subjects respectively. T Frusca et al evaluated whether abnormal uterine artery velocimetry in patients with pregnancy-induced hypertension is more predictive of the outcome of pregnancy than the presence of proteinuria and the severity of hypertension. A retrospective study was conducted on 344 hypertensive pregnant women who underwent uterine artery Doppler investigation. Patients were classified as either preeclamptic or with gestational hypertension at follow-up 2 months after delivery. Pregnancy outcomes of patients with preeclampsia and gestational hypertension were correlated to uterine artery velocimetry. A further analysis was done dividing patients into mild and severe groups. An abnormal uterine Doppler was related to a significantly earlier week of delivery (32.5 versus 35.3 in preeclampsia, 33.6 versus 38.1 in gestational hypertension), a lower mean birth weight (1494 g versus 2320 g in preeclampsia, 1690 g versus 2848 g in gestational hypertension), and a higher number of growth-restricted fetuses (70% versus 23% in preeclampsia, 75% versus 20% in gestational hypertension). In both mild and severe hypertensive groups, abnormal uterine velocimetry was associated with a worse pregnancy outcome (delivery at week 33.1, versus 37.9 in the mild group; 32.7 versus 37.3 in the severe group; birth weight 1574 g versus 2741 g in the mild group; 1539 g versus 2742 g in the severe group). A multivariable analysis of the presence of proteinuria, severity of hypertension, and uterine Doppler revealed that only an abnormal uterine Doppler was significantly related to adverse perinatal outcome ($P < .001$). Abnormal uterine Doppler was the variable that was more frequently associated with adverse pregnancy outcome.¹²

CONCLUSION

Doppler velocimetry is useful in distinguishing the serious patients from those where the approach can be a bit more conservative.

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