Increasing trends of pregnancy induced hypertension -Need for uterine artery doppler as a predictor

Naimisha Movva^{1*}, M Vijayasree²

¹Assistant Professor, ²Professor and HOD, Department of Obstetrics and Gynaecology, Mamata Medical College, Khammam, INDIA. **Email:**naimishamovva@gmail.com

Abstract Background: Pregnancy induced hypertension is one of the most common complication in pregnancy and it affects up to 10 - 12% of pregnancies across the globe. **Objective:** To study the role of uterine artery doppler in early 2nd trimester in prediction of pregnancy induced hypertension. **Methods:** A prospective case control study was done in 150 antenatal women during a period of one year in Obstetrics department. Blood and urine investigations were done at their first visit, uterine artery doppler changes if any were recorded in these women during early 2nd trimester and followed up till delivery. **Results:** This study showed primigravida and age group around 25 to 30 years having a greater incidence of uterine artery notching and risk of developing hypertension. This study has sensitivity of 83.7%, specificity of 84.9%, positive predictive value 64.5% and negative predictive value of 94%. **Conclusion:** Our study shows presence of bilateral uterine artery notching having high sensitivity and specificity in predicting pregnancy induced hypertension. Thus, uterine artery doppler at early second trimester can consider to be best noninvasive screening test available in prediction of pregnancy induced hypertension and should be advised routinely in early 2nd trimester irrespective of risk factors for a timely intervention and a better outcome.

Key Word: uterine artery doppler, pregnancy induced hypertension, primigravida.

*Address for Correspondence:

Dr. Naimisha Movva, Assistant Professor, Department of Obstetrics and Gynaecology, Mamata Medical College, Khammam- 507001, Telangana, INDIA.

Email:naimishamovva@gmail.com

Received Date: 07/01/2019 Revised Date: 15/03/2019 Accepted Date: 02/05/2019 DOI: https://doi.org/10.26611/101210214



INTRODUCTION

Hypertensive disorders of pregnancy remain among the most significant and intriguing unsolved problems in obstetrics. Pregnancy induced hypertension is one of the most common complication in pregnancy and it affects up to 10 - 12% of pregnancies across the globe.¹ The national incidence of hypertensive disorders is 15.2% in India, while it is four times higher in primigravida women than in multipara.^{2,3} Hypertension in pregnancy is a

systolic blood pressure ≥ 140 mmHg or diastolic blood pressure \geq 90 mmHg or both. Both systolic and diastolic blood pressure raises are important in the identification of Pregnancy induced hypertension⁴. Pregnancy induced hypertension (PIH) is hypertension that occurs after 20 weeks of gestation in women with previously normal blood pressure. The broad classification of pregnancyinduced hypertension during pregnancy is gestational hypertension, pre-eclampsia and eclampsia⁵. Trophoblastic invasion of the uterine spiral arteries substantially increases compliance to accommodate increased blood flow to the placenta. Failure of this process impedes uterine artery blood flow, and this may be detected by uterine artery Doppler flow studies resulting in persistence of high resistance blood flow and early diastolic notch. Doppler ultrasound evaluation of uterine artery impedance in the second trimester has been used as an early screening test for PIH.⁶ Women with pregnancy induced hypertension are at increased risk for preeclampsia, caesarean delivery, renal dysfunction and placental abruption along with associated fetal risks.

How to cite this article: Naimisha Movva, M Vijayasree. Increasing trends of pregnancy induced hypertension -Need for uterine artery doppler as a predictor. *MedPulse International Journal of Gynaecology*. May 2019; 10(2): 82-86. http://medpulse.in/Gynaecology/index.php

Regular monitoring for hypertension and proteinuria, consideration of expectant management or labour induction and appropriate use of antihypertensives therapy are essential components in the management of pregnancy induced hypertension. women with Hypertensive disorders in pregnancy is one of the most extensively researched subjects in obstetrics. However, the clinical utility of uterine artery Doppler flow studies in the prediction of adverse pregnancy outcomes in a general population is limited. We sought to therefore determine the utility and effectiveness of early secondtrimester uterine artery Doppler in predicting pregnancy induced hypertension for an early intervention to decrease the adverse outcomes. Hence present work was aimed to study the role of uterine artery doppler during early second trimester (13-16 weeks) in prediction of pregnancy induced hypertension. The study was further divided into 2 groups and risk identified group (with bilateral uterine artery notching) were analyzed and compared in accessing the maternal outcome.

MATERIALS AND METHODS:

Period of Study: A prospective case control study was done study in Mamata Medical College, Khammam during a period of one year from January 2018 to January 2019.

Study Group: 150 antenatal women (both primigravida and multigravida) were included for the study after taking proper consent. They were screened with uterine artery doppler at early second trimester (13-16 weeks) during their regular antenatal visit, routine investigations and follow up was done till delivery.

Inclusion criteria: antenatal women with no past history of medical disorders, no fetal anomalies, no multiple pregnancies.

METHODOLOGY

For all the patients included in the study a detailed history, obstetric examination, basic investigations like complete blood, urine investigations and Ultrasonogram were done at their first visit. They underwent screening with bilateral uterine artery doppler at 13-16 weeks of gestation. The presence of an early diastolic notch on both sides of the uterine artery waveforms was recorded. At every antenatal visit, blood pressure and urine for protein was tested. Follow up was done among the patients for the presence and absence of persistent uterine artery notching. Further analysis was done among antenatal women between those who developed hypertension after 20 weeks of gestation and those who remained normotensives. In women who developed hypertension, antenatal fetal surveillance was done regularly, antihypertensives were given as per requirement, regular biochemical investigations were done and managed conservatively till 34-36 weeks. Delivery was done depending on maternal and fetal conditions. Data was analyzed using SPSS software and P value <0.05 was considered significant.

RESULTS

In the present study, All the antenatal women included were screened with uterine artery doppler at 13-16 weeks. Total no antenatal women in the study were 150 and number of antenatal women with uterine artery notching were 48 (group A) cases whereas, total number of antenatal women without uterine artery notching were 102 (group B) controls (Figure 1)



Figure 1: Distribution of study subjects

Table 1: Distribution of antenatal women who developed hypertension				
	Grou	ip A (48)	Group B (102)	
Pregnancy induced hypertension	31	65%	6	6%
Normotensives	17	35%	96	94%

Table 1 shows in group A antenatal women who were identified with bilateral uterine artery notching, 65% developed hypertension and 35% remained normotensives. In group B, only 6% developed hypertension with absence of uterine artery notching during early second trimester screening. There was a significant relationship seen in identifying uterine artery notching at early 2^{nd} trimester in development of hypertension during pregnancy (Chi square – 60.52, P value<0.05)

Naimisha Movva, M Vijayasree

Table 2: Distribution according to maternal age among all antenatal women included in the study (n=150)

Maternal age	Group A (n=48)		Group B (n=102)	
<25	17	35%	48	47%
25-30	22	46%	36	35%
>35	9	19%	18	18%

Table 2 shows group A has the presence of bilateral uterine artery notching was high (46 %) in age group of 25-30; around 35% below 20 years age group and 19% above 35 years. The youngest being 17 years and oldest being 36 years in the study who showed presence of uterine artery notching on screening.



Figure 2: Distribution according to gravidityamong all antenatal women included in the study (n=150)

Figure 2 shows, in group A 62% of antenatal women were primigravida and 38% of antenatal women were multigravida. In group B, 42% were primigravidae while 58% of antenatal women were multigravida. This figure 2 shows a significant relationship of presence of uterine artery notching with gravidity (Chi square- 5.407, P value – 0.05, P<0.05 significant), proving a greater number of primigravidae showed presence of uterine artery notching in this study.

Table 3: Table showing distribut	ion of Gestational age at which antena	atal women included in the study, developed hypertension.
Costational ago in woo	No of antenatal women who	No of antenatal women
Gestational age in wee	developed hypertension in grou	up A who developed hypertension in group B
20-28 weeks	8(26%)	0
28-34 weeks	12 (39%)	2(33%)
>34 weeks	11(35%)	4(67%)

Table 3 shows in group A- 31 antenatal women developed hypertension at various gestational age above 20 weeks. About 39% developed hypertension at 28-34 weeks of gestation, 35% developed hypertension at more than 34 weeks of gestation while only 26% developed hypertension in less than 28 weeks.

THE I Distribution of gestational ago, at million antonatal monor instatuo a in the state y doin of ou.	TABLE 4: Distribution of ge	estational age, at whicl	n antenatal women in	icluded in the study	/ delivered.
--	-----------------------------	--------------------------	----------------------	----------------------	--------------

Group A		Group B			
Gestational age in weeks	No of pregnant women with hypertension (n=31)	No of pregnant women without hypertension (n=17)	No of pregnant women with hypertension (n=6)	No of pregnant women without hypertension (n=96)	
<34 weeks	8 (26%)	2(11%)	1(17%)	5 (5%)	
>34 weeks	23(74%)	15(89%)	5(83%)	91 (95%)	
			11 0 04 1	1	

Table 4 shows in group A-31 developed hypertension, of them 8 delivered before 34 weeks (severe preeclampsia -2, eclampsia-2, abruption-3, IUD-1) and 23 of them delivered after 34 weeks of gestation. In group B, 6 developed hypertension and among them 1 antenatal woman delivered before 34 weeks due to APH and rest delivered at term gestation.

MedPulse International Journal of Gynaecology, ISSN: 2579-0870, Online ISSN: 2636-4719, Volume 10, Issue 2, May 2019 pp 82-86



Figure 3: Bilateral uterine artery notching at early 2nd trimester (13-16 weeks)

DISCUSSION

Pregnancy induced hypertension is the most common obstetrical disorder world-wide and on a national scale Pregnancy induced hypertension remains to be a leading cause of maternal and fetal morbidity and mortality around the world especially in developing countries. The multifactorial etiology makes it challenging in identifying the ideal predictive test for hypertensive disorders in pregnancy. In our study the presence of bilateral uterine artery notching in early second trimester predicted the possible development of hypertension in 65% antenatal of women, showing statistically significant association between positive uterine artery doppler notching and development of hypertension in pregnancy. The uterine artery doppler test gives a sensitivity of 83.7%, specificity of 84.9%, PPV-64.5% and NPV- 94% in our study. The similar results are seen in a few studies by Neravi group⁷ (specificity- 84.62%, sensitivity - 34.29%), Chakraborty and co-workers⁸ in 2017 (PPV-86.6%, NPV-97.14%), Leelavati group9 in 2016 (sensitivity- 81.46% and specificity -92.5%), Neela¹⁰ in 2016 (sensitivity -71.42%, specificity -74.41%) and Sharma group¹¹ in 2015 (sensitivity-60%, specificity-100%, PPV- 100%, NPV-85.37%) respectively. Abnormal uterine artery doppler findings were seen greater in age group of 25-30 similar to the earlier several studies 7,8,12 . Though the authors say hypertensive disorders are more common at extremes of age. This is attributed to the smaller sample size of the study or the changing trends in hypertensive disorders in pregnancy. The present study showed statistical significance of uterine artery notching with gravidity. Primigravida were at a higher risk of developing hypertension in our study and results were similar to other studies 7-10. In our study early onset of hypertension before 34 weeks was seen in a greater percentage among those who had presence of uterine artery notching at early second trimester (13-16 weeks). Though there was no statistically proven significance for development of hypertension with gestational age, similar results were seen in study done by Rekha group¹⁰. In the present study, among the risk identified group with uterine artery notching, 65% developed hypertension and among them a

greater percentage 74% of antenatal women delivered after 34 weeks of gestation. Though there were a significant percentage of antenatal women who developed hypertension in the risk identified group. Their regular follow-up and surveillance to identify signs helped us to intervene and there by preterm births because of identification of uterine artery notching while screening, a regular follow-up and surveillance to identify signs of hypertension helped to intervene and thereby decrease early preterm births.

CONCLUSION

Estimation of uterine artery notch in early second trimester may bring about early recognition of patients at risk of PIH before the clinical symptoms and complications appear for a better maternal and fetal outcome. We conclude that Doppler ultrasound evaluation reflects high impedance in impaired uteroplacental blood flow and the results of our study support the use of Doppler uterine artery notch analysis as an important need for predicting PIH. The derived statistical data including the sensitivity and P values correlate with previous studies thus testifying hypothesis to be positive. The findings indicate that the availability of Doppler studies leads to better obstetrical decision making. Uterine artery diastolic notching shows a high specificity for predicting PIH.

REFERENCES

- 1. Vest AR, Cho LS. Hypertension in pregnancy. Current atherosclerosis reports. 2014 Mar 1; 16(3):395.
- Dutta DC. Text book of obstetrics. 9rd edition, New Central Book Agency (Pvt) Ltd., Calcutta. 1995. pp. 230-236.
- ACOG Committee on Obstetric Practice. ACOG practice bulletin. Diagnosis and management of preeclampsia and eclampsia. Number 33, January 2002. American College of Obstetricians and Gynecologists. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics. 2002 Apr;77(1):67.
- Lo JO, Mission JF, Caughey AB. Hypertensive disease of pregnancy and maternal mortality. Current Opinion in Obstetrics and Gynecology. 2013 Apr 1;25(2):124-32.

Naimisha Movva, M Vijayasree

- Paola Aghajanian P, Ainbinder S, Andrew E, Vicki VB, Heather B, Helene B, et al. Current Diagnosis and Treatment in Obstetrics and Gynecology. the McGraw-Hill; 2006.
- Harrington D. Cooper C. Lees K. Hecher S. Campbell. The use of uterine artery Doppler in pregnancy induced hypertensive disorders. Obstetrics and Gynaecology, MD Kaunus University; 1997.p.16–8.
- Asha Neravi, VoorkaraUdayashree. Role of uterine artery Doppler at 12 to 16 weeks of gestation in prediction of pre-eclampsia an observational study. Int J Reprod Contracept Obstet Gynecol. 2018 Aug;7(8):3162-3167
- Saptarshi Chakraborty, Surabhi Saharan- Uterine artery Doppler study for the prediction and the severity of the hypertensive disorders during pregnancy. Int J Reprod Contracept Obstet Gynecol. 2017 Jul;6(7):2903-2909

- Leelavathi, Kaytri S. International Journal of Reproduction, Contraception, Obstetrics and Gynecology Leelavathiet al. Int J Reprod Contracept Obstet Gynecol. 2016 Oct;5(10):3556-3559
- NeelaAruna Rekha, Babu M.S, Ashwani N, Reddy S.R. Uterine artery Doppler as a predictor of pre eclampsia – hospital based study. Int J Med Res Rev 2016;4(9):1655-1661.\
- Seema Sharma, Manju Maheshwari, Shubhra Gupta. Uterine artery diastolic notch as a predictor of pregnancy induced hypertension. Indian Journal of Obstetrics and Gynecology Research, April-June 2015;2(2):97-100
- 12. Kooffreh ME, Ekott M, Ekpoudom DO. The prevalence of pre-eclampsia among pregnant women in the University of Calabar Teaching Hospital, Calabar Prevalence. 2014;3(3):133-6.

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

MedPulse – International Journal of Gynaecology, ISSN: 2579-0870, Online ISSN: 2636-4719, Volume 10, Issue 2, May 2019