

Study of Fundus changes in Pregnancy Induced Hypertension in Bundelkhand region

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Abstract: To determine the prevalence of retinal changes in pregnancy induced hypertension (PIH) and any association between the retinal changes and blood pressure, and severity of the disease. 100 patients admitted with diagnosis of PIH were included in this study. Age, gravida, blood pressure, and proteinuria were noted. After taking history for any eye symptoms, fundus examination was done after dilating the pupils with direct ophthalmoscope in the ward itself. Hypertensive retinopathy were graded by using the Keith Wagner Barker classification All the findings were noted on a data sheet, and were analyzed using SPSS programme. Maximum number of PIH cases (66%) were found in the age group of 21–25 years. 67% of the cases were seen in primigravidas and 33% were multigravida. 71% patients of mild preeclampsia, 24% patients of severe preeclampsia and 5% of eclampsia. 36% patients had normal fundus findings and the rest 64% patients had hypertensive retinopathy, 32% had grade 1 hypertensive retinopathy, 24% had grade 2, 6% had grade 3 and 2% of the cases had grade 4 hypertensive retinopathy. Fisher's exact test was done. Study showed positive correlation between fundus findings and severity of PIH (P value 0.000). There was no correlation of fundus findings with age or parity of the patient. Retinal changes were seen in 64% of patients with PIH. Occurrence of hypertensive retinopathy in PIH cases has been decreased due to better antenatal care and early detection and treatment of PIH cases. There is a greater chance of developing retinopathy with increase in blood pressure, severity of PIH, and proteinuria in cases of PIH.

Keywords: Eclampsia, hypertensive retinopathy, preeclampsia, pregnancy-induced hypertension, retinal changes

Date of Submission: 15-04-2020

Date of Acceptance: 30-04-2020

I. Introduction

Pregnancy-induced hypertension (PIH) is a hypertensive disorder in pregnancy that occurs in the absence of other causes of elevated blood pressure (140/90 mmHg, or a rise of 30 mmHg of systolic pressure, or a rise of 15 mmHg of diastolic pressure), taken on two occasions after rest, in combination with generalized edema and/or proteinuria. Pregnancy induced hypertension (PIH) is one of the most common medical problem in pregnancy, affecting 7–10% of all pregnancies.^[1] Ocular involvement in PIH is common and the occurrence rate varies from 30-100% in different studies.^[2] PIH is characterized by hypertension without proteinuria and edema. Preeclampsia is characterized by hypertension, proteinuria, and generalized edema.^[3] When preeclampsia progresses and convulsions develop, the condition is termed as eclampsia.^[3-5]

In the eye the retina is a unique site where the vasculature in the human body is visualized directly with the help of ophthalmoscope. it gives a reasonable idea of the state of placental circulation and fetal wellbeing. Fetal and maternal complication can be avoided if PIH is detected early. Since, termination of pregnancy is indicated in severe hypertensive retinopathy.^[6] Evaluation of fundus is crucial in all patients of PIH. Fundoscopic findings in PIH include arteriovenous crossing changes, hemorrhages, exudates in retina, exudative retinal detachment, and choroidal infarcts.^[7] Cortical blindness is one of the important causes of blindness in toxemia of pregnancy.^[8]

II. Materials and Methods

Cross sectional, observational study was conducted in the Department of Ophthalmology, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India, over a period of 14 months from January 2019-February 2020 the study were done on the 100 patients admitted with pregnancy induced hypertension in department of obstetrics and gynaecology in Maharani laxmi bai medical college, Jhansi. The procedures followed were in accordance with the ethical standards committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

Inclusion criteria

1. All the patients who fulfilled the diagnostic criteria of PIH (>24 weeks of pregnancy, high arterial blood pressure and proteinuria) admitted in Obstetric.
2. Signed an informed consent taken from patients,
3. There was no history of systematic cardiovascular or nervous diseases

Exclusion criteria

1. Patients who were not willing to participate in the study.
2. Patients with pre-existing diabetes mellitus, renal disease, hypertension, anaemia, connective tissue disorders blood dyscrasias,
3. Patients with high myopia, lenticular and corneal opacities. history of ocular trauma, surgery or previous laser treatment and having hazy media which hinders the fundus examination were excluded from the study.
4. Patients with malignancy, leukaemia.

After taking history for any eye symptoms, anterior segment was examined with torch light on the bed itself. Both pupils were dilated with 1% tropicamide eye drops, and fundus examination was done with a direct ophthalmoscope in a semi dark room in the ward. Hypertensive retinopathy changes seen on right or left or both eyes was taken as positive findings in that patient. Age, race, para, grvida, , systolic and diastolic blood pressure, proteinuria were noted from the case records. The PIH was graded as gestational hypertension, preeclampsia, and eclampsia. All the findings were noted on a data sheet. The retinal changes (hypertensive retinopathy) were graded according to Keith Wagener classification into:

Grade 1: Mild generalized arterial attenuation, particularly of small branches;

Grade 2: More severe Grade 1 + focal arteriolar attenuation;

Grade 3: Grade 2 + hemorrhages, hard exudates, cotton wool spots; Grade I- mild generalized arterial attenuation, particularly of small branches;

Grade 4: Grade 3 = optic disc swelling (papilledema).^[9]

The severity of PIH was classified into preeclampsia (mild and severe) and eclampsia, based on the following findings:

Mild preeclampsia --- BP >140/90mmHg, proteinuria+, and/or mild edema of legs;

Severe preeclampsia --- BP > 160/110mmHg, proteinuria ++ or +++, headache, cerebral or visual disturbances, epigastric pain, impaired liver function tests, and increased serum creatinine;

] = Eclampsia ---severe preeclampsia + convulsions. Proteinuria was tested using dipstix method and was graded as + = 0.3gm/L, ++ =1gm/L, and +++ = 3gm/L.^[10]

The results were analyzed using SPSS program. Chi-square test (fisher exact) was used. A value <0.05 was taken as significant.

III. Results

Data of all 100 patients were studied and were tabled under various headings.

Table 1: Distribution of Patients according to age.

Age (Years)	Number of patients	Percentage
<20 years	10	10
>20-25 years	62	62
>25-30 years	21	21
>30 years	7	7
Total	100	100

Table 1 showed, most of PIH cases (62%) were found in the age group of 21–25 years.

Table 2: Distribution of Patients according to grvida

Gravida	Number of patients	Percentage
Primigravida	67	67
Multigravida	33	33
Total	100	100

In over study out of 100 patients, 67 were primigravida and 33 were multigravida

Table 3: Diagnosis Distribution of Patients .**Diagnosis Frequency Percent**

Diagnosis	Frequency	Percentage
Eclampsia	5	5

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Severe preeclampsia	24	24
Mild preeclampsia	71	71
Total	100	100

As, table 3, 71% of patients were present with mild preeclampsia, 24 % patients were of severe preeclampsia and 5% patients were of eclampsia.

Table 4: Diagnosis of patients studied in relation to Retinopathy Grading. Diagnosis Frequency Percent

Diagnosis	Frequency	Percentage
Normal	36	36
Grade 1	32	32
Grade 2	24	24
Grade 3	6	6
Grade 4	2	2
Total	100	100

In this study, Grade 1 hypertensive retinopathy changes were found in 32% patients, Grade 2 changes were found in 24%, Grade 3 were found in 6% and grade 4 changes were found in 2%.

Table 5 : Correlation of fundus finding with severity of PIH

Fundus Finding	Mild Preeclampsia		Severe Preeclampsia		Eclampsia		Total		P Value
	N	%	N	%	N	%	N	%	
Normal	36	50.7	0	0	0	0	36	36	0.000
Grade 1	22	31	10	42	0	0	32	32	
Grade 2	12	16.9	10	42	2	40	24	24	
Grade 3	1	1.4	4	16	1	20	6	6	
Grade 4	0	0	0	0	2	40	2	2	
Total	71	100	24	100	5	100	100	100	

In the study, fundus changes was correlated with the severity of hypertension and Fisher's exact test was done. P value was found (0.000), showing the positive correlation between them, which shows that there is more chance of the patient having abnormal fundus finding as the severity of hypertension increases.

Table 6 : Correlation of fundus finding with age group

Fundus Finding	Age ≤20 years		Age >20-25 years		Age >25-30 years		Age >30 years		Total		P Value
	N	%	N	%	N	%	N	%	N	%	
Normal	4	40	26	41.9	4	19	2	28.6	36	36	>0.05
Grade 1	3	30	21	33.9	6	28.6	2	28.6	32	32	
Grade 2	2	20	14	22.6	7	33.3	1	14.2	24	24	
Grade 3	0	0	1	1.6	3	14.3	2	28.6	6	6	
Grade 4	1	10	0	0	1	4.8	0	0	2	2	
Total	10	100	62	100	21	100	7	100	100	100	

As table 6, The different fundus findings and age of the patients were compared, P value was >0.05, which is statistically insignificant. This showed that there is no correlation between the age of the patient and their fundus findings.

Table 7 : Correlation of fundus finding with parity

Fundus Finding	Primigravida		Multigravida		Total		P Value
	N	%	N	%	N	%	
Normal	19	28.3	17	51.5	36	36	>0.05
Grade 1	27	40.3	5	15.2	32	32	
Grade 2	16	23.9	8	24.2	24	24	
Grade 3	3	4.5	3	9.1	6	6	
Grade 4	2	3	0	0	2	2	
Total	67	100	33	100	100	100	

In table 7, Parity and fundus findings were compared, P value from Fisher's exact test was >0.05, which is statistically insignificant. Hence, the fundus findings had no correlation with parity.

IV. Discussion

This study was undertaken to evaluate the fundus changes in patients of PIH. PIH is one of the most common causes of morbidity and mortality in obstetrics and is a hypertensive disorder with multisystem involvement, that affects 3-5% of pregnancies.^[11,12] In our study of 100 patients, most of cases (62%) were in the age group of >20-25 years, 21% cases were seen between the age group of 26-30 years, 10 % cases of age < 20 years and the rest 7% patients of >30 years. In a study done by N. Rama Bharathi et al^[13] majority of cases 76.66% were in the 21-30 years group and in a study done by Varija T et al^[14] majority of cases 79.6% were in the age group of 20-25 years which is similar to present study. This result could be because of more number of pregnant women tend to fall in to this age group. In present study 67% of the cases were primigravidae and 33% cases were multigravidae. Though PIH as found more in primigravidae but present study donot showed association between fundus findings and the parity of patients as P value 0.107 is not significant. In a study done by N. Rama Bharathi et al^[13] and Varija T et al^[14] 70% and 66.7% of the cases were primigravidae respectively, similar to present study.

In the present study, maximum no. of the cases 71% were of mild preeclampsia, 24% of severe preeclampsia and the 5% of eclampsia, there was no patient of gestational hypertension in the study. Maximum cases of mild preeclampsia found, could be due to good antenatal medical check up.

Similarly in the study done by Tadin et al^[15] from Croatia 55% of mild preeclampsia, 25% of severe preeclampsia and 20% of eclampsia and in a study done by N.Rama Bharathi et al^[13] 11.33% of gestational hypertension, 48.66% of mild preeclampsia, 24.66% of severe preeclampsia and 15.33% of eclampsia, similar to present study. The study done by Reddy et al^[16] showed 38.5% patients of mild preeclampsia, 59% patients of severe preeclampsia and 2.5% patients of eclampsia. Max cases of severe preeclampsia were found. This could be due to lack of awareness of antenatal check up among the patients. In our study retinal changes were found in 64% of the patients. Rest 36% patients had normal fundus finding. Present study show positive association of fundus finding with severity of pregnancy induced hypertension. There is more chance of the patient having abnormal fundus finding as the severity of pregnancy induced hypertension increases. In the study done by Reddy et al 16 includes 78 patients with PIH showed prevalence rate of 59%. Tadin et al^[15] from Croatia, he found 45% of retinal changes in their study on 40 patients with PIH. In a study done by N. Rama Bharathi et al^[13], The prevalence rate of fundus changes was 23.33% lesser than that of our study but showed positive correlation with blood pressure and severity of disease of hypertensive retinopathy. In the present study Grade 1 hypertensive retinopathy changes were found in 32% patients, Grade 2 changes were found in 24 %, Grade 3 were found in 6% and grade 4 changes were found in 2% of patients. which is similar to the study done by Yadav et al^[17], Grade 1 in 32 % cases, Grade 2 in 21% Grade 3 were found in 6% and grade 4 changes were found in 2% of patients. Their study stated that hypertensive retinopathy is the prognostic factor in determining the severity of preeclampsia and that examination of fundus is a valuable and also plays an important role diagnosis in preeclampsia.

V. Conclusion

The retinal vascular changes have been said to correlate with the severity of hypertension. Many studies have considered the progression of retinal vascular changes as a sign of increasing severity of PIH and have correlated them with foetal mortality as well as maternal outcome. These changes help as a guideline for termination pregnancy as they may reflect similar ischemic vascular changes in the placenta.

Ophthalmoscopy is a simple tool that can help the obstetrician in assessing the severity of disease in cases of PIH. In general, it is believed that the presence of changes in the retinal arterioles and retinal haemorrhages may indicate similar changes in the placenta. Since the wellbeing of the foetus depends on the placental circulation, ophthalmoscopic examination of mother's fundus may give a clue to similar microcirculation changes in the placenta and indirectly to the foetal wellbeing and maternal outcome. Fundus examination in patients with PIH is an important clinical evaluation to predict adverse foetal outcome.

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Dr.Punam Tiwari,etal. “Study of Fundus changes in Pregnancy Induced Hypertension in Bundelkhand region ” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(4), 2020, pp. 46-50.