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Original Article

Study on ocular fundus changes in pregnancy induced hypertension in a tertiary care hospital

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Abstract
Introduction: Pregnancy induced hypertension (PIH) is one of the leading causes of perinatal mortality and morbidity. The retinal vascular changes correlate with the severity of systemic hypertension hence fundus examination in PIH may give a clue about severity of disease. This study was done to know the prevalence of fundus changes in PIH patients.
Materials and Methods: All the patients who fulfilled inclusion and exclusion criteria were enrolled for this cross sectional, observational study. Detailed history was taken and ocular examinations was done. Fundus changes were graded according to Keith Wagner and Barker (KWB) classification. The results were presented in Microsoft excel and analyzed.
Results: Among 82 PIH cases, 46 were classified as gestational hypertension, 23 had mild PIH. Amongst all the PIH cases examined 48 patients showed no fundus changes whereas 34 patients had retinopathy changes.
Conclusion: Severe form of preeclmpsia and eclampsia had advanced grades of retinopathy changes. Retinal examination reveals important objective information related to PIH also helps in their accurate diagnosis so plays a vital role in the management of PIH.

Keywords: PIH, KWB, proteinuria, preeclampsia

Introduction
Pregnancy induced hypertension is one of the leading causes of perinatal and maternal mortality and morbidity across the world [1-4]. Pregnancy-induced hypertension (PIH) is a hypertensive disorder in pregnancy after 20 weeks of gestation 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 occasion with at least 4 hour interval, in combination with generalized oedema and/or proteinuria. PIH includes gestational hypertension, preeclampsia and Eclampsia [5]. Gestational hypertension is characterized by hypertension without proteinuria and oedema. Preeclampsia is characterized by hypertension, proteinuria, and generalized edema [6]. Progression of PIH leading to development of convulsions is termed as eclampsia [6-8].
The pathological changes of this disease appear to be related to vascular endothelial dysfunction and its consequences (generalized vasospasm and capillary leak) [9]. The retinal vascular changes generally correlate with the severity of systemic hypertension hence fundus examination in such patients may give a clue about severity of the vascular changes and in turn may indicate about severity of disease [10].
There are very few studies done in relation to prevalence and type of fundus in pregnancy induced hypertension and so there is paucity of data available in the published especially from India. The present study was done to know the prevalence of ocular fundus changes and to evaluate the ocular fundus changes in PIH at presenting to tertiary healthcare center.

Materials and Methods
This was a cross sectional observational study conducted at a tertiary care centre over a period of 12 months (September 2017 to August 2018). All the patients who fulfilled the diagnostic criteria of PIH, admitted in Obstetric ward of the hospital were included in the study. Patients with history of pre-existing hypertension, convulsions, renal disease, diabetes mellitus, were excluded from the study. Patients with hazy ocular media were also excluded

from the study as it is difficult assess the fundus in such patients. After obtaining consent from the patients, detailed general history and ocular history was taken and ocular examinations was done. Anterior segment examination was done with torch light. Fundus examination was done by experienced ophthalmologist with direct and indirect ophthalmoscopes after dilating the pupil with 1% tropicamide eye drops. Fundus changes if any were graded according to modified Keith Wagner and Barker (KWB) classification [11]. Data related to the patient like age, gravida, Blood Pressure, proteinuria etc were recorded from patients case records. The results were presented in Microsoft excel sheet and analyzed using SPSS software. Results were expressed in frequencies and percentages.

Results

A total of 82 cases were found to be having PIH during our study period. Out of these 82 cases, 52(63%) were unbooked cases. The mean age of the patient was 26±5.8 years (range 19 to 38years).

The frequency and distribution of patients according their age and fundus changes in them is given in table 1. The gestation period of patients at the time of examination ranged from 22 weeks to 41 weeks. Among 82 PIH cases 46 were classified as gestational hypertension, 23 had mild PIH whereas 11 and 2 had severe preeclampsia and eclampsia respectively. Amongst all the PIH cases examined 48 patients showed no fundus changes whereas 34 patients had retinopathy changes. The fundus changes in relation to different grades of PIH is given in table 2. In our study 35 patients were primi gravida. Distribution of fundus finding in relation the number of gravida is given in table 3. Forty eight patients with PIH had no fundus changes in the current study whereas 34 patients had had fundus changes of various grades. Frequency and distribution of cases of PIH based on grades of hypertensive retinopathy as per KWB classification given in table 4:

Table 1: Fundus changes in different age group of PIH patients

Age group	No of PIH cases	PIH Cases with fundus changes	
		Count	%
Less than 25	46	21	45.65
25 to 35	33	12	36.36
More than 35	03	01	33.33
Total	82	34	41.46

Table 2: The frequency and distribution of fundus changes in relation to different grades of PIH

Grades of PIH	No of cases of PIH	PIH Cases with fundus changes	
		Count	(%)
Gestational hypertension	46	07	15.21
Mild Preeclmpsia	23	16	76.19
Severe preeclampsia	11	09	81.81
Eclampsia	02	02	100.00
Total	82	34	41.46

Table 3: The frequency and distribution of fundus changes in relation to different gravida states

Gravida	No of PIH	Cases of PIH with fundus changes	
		Count	%
Primigravida	35	21	60.00
Multigravida	47	13	27.66

Table 4: The frequency and distribution of PIH cases based on hypertensive retinopathy fundus changes as per modified Keith Wagner and Barker classification

Hypertensive retinopathy changes	PIH cases	
	Count	%
Nil	48	58.53
Grade 1	14	17.03
Grade 2	11	14.00
Grade 3	08	13.41
Grade 4	01	01.21
Total	82	

Discussion

Out of the 82 patients, majority had gestational hypertension or mild preeclampsia only. Severe preeclampsia and eclampsia were less frequent. Similar findings were reported by Shah AP where in gestational hypertension was more commonly prevalent than preeclampsia or eclampsia [12].

The incidence of PIH as well as positive fundus findings were seen to be more common in patients with lower age group i.e below 25 years of age. Non-compensatory hypertension could be the likely reason for higher incidence of PIH and PIH related fundus changes in younger age group. Lower prevalence of fundus changes in higher age group could be due to sclerosis of retinal arterioles which prevents retinopathy changes. This is consistent with the study done by Neutra *et al.* which reported that women under 20 years were six to seven times more susceptible than those in age 25-29 years [13].

Fundus changes were more frequently see in patients with eclampsia and severe preeclmpsia than those with mild preeclampsia or gestational hypertension. This again indicates that, as the disease progress the retinal changes become more frequent. So the grades of retinal changes may reveal the severity of the disease and in turn the outcome.

The prevalence of PIH was more common in primi gravida patients than gravid two or multi gravida. Fundus changes were also more commonly seen in primi gravida patients. Higher the gravida prevalence of fundus findings become lesser in PIH patients. This could be again due to the arteriolar sclerosis in aged patients who are multigravida. Similar results were seen in a study by Babbar *et al*. which showed 70.42% of the cases of pregnancy induced hypertension were primigravidas, while the remaining were multigravida [14].

In our study majority of the patients had no retinopathy changes where as some had grade1 retinopathy changes as per KWB classification. Grade IV hypertensive retinopathy with papilledema was rarely seen (only in 2 patients). Similar results were seen in a study by Reddy SC *et al.* in which there were no retinopathy changes in 41% of them, Grade 1 retinopathy changes in 52.6%, Grade 2 changes in 6.4% and no Grade 3 and 4 changes were observed [15].

Conclusion

Pregnancy induced hypertension is more common in young patients and primi gravida patients. Gestational hypertension is more commonly seen. Gestational hypertension and mild preeclmpsia patients showed no or minimal fundus changes where as severe form of preeclmpsia and eclampsia had advanced grades of retinopathy changes. Retinal examination reveals important objective information related to PIH also helps in their accurate diagnosis so plays a vital role in the management of PIH and further helps prevent morbidity and mortality due to PIH.

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