

Prevalence of hypertensive retinopathy in pregnancy induced hypertension

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Abstract

Background: The pathological changes of pregnancy induced hypertension appear to be related to vascular endothelial dysfunction and its consequences. The retinal vascular changes generally, but not always, correlate with the severity of systemic hypertension. Progression of retinal changes correlates with progression of hypertensive disorders of pregnancy and foetal mortality due to similar vascular ischaemic changes in placenta. **Aim & Objective:** 1. Prevalence of hypertensive retinopathy in pregnancy induced hypertension 2. To study the ocular fundus changes in pregnancy induced hypertension. **Methods: Study design:** Prospective observational Study. **Study setting:** Department of ophthalmology of tertiary care center. **Study duration:** October-2020 to October-2022. **Study population:** The study population included all the cases with PIH admitted in OBGY department and referred to ophthalmology department for fundus changes such cases were included in the study. **Sample size:** 115 **Results:** maximum number of PIH patients 70 (60.9%) belonged to age group 21-25 years followed by 30 (26.1%) PIH patients belonged to 26-30 years. About 10(8.7%) PIH patients were belonged to 31-35 years & only 5 (4.3%) PIH patients were aged between 36-40 years. Among 115 PIH patients 82 (71.30%) were had severe pre-eclampsia followed by 28 (24.35%) had mild pre-eclampsia & 5 (4.35%) had eclampsia. among 115 PIH patients 91 (79.1%) had no any complaint. About 13 (11.3%) had headache & blurring of vision followed by 6 (5.2%) had headache & 5 (4.3%) had blurring of vision. 42 (36.5%) PIH patients had no any retinal changes on fundus finding. The most common fundus finding among PIH patients was generalised arteriolar attenuation 45 (39.1%) followed by focal generalised arteriolar attenuation 20 (17.4%). About 6 (5.2%) PIH patients showed flame shaped haemorrhages, Cotton wool spot & 2(1.7%) PIH patients showed flame shaped haemorrhages, Cotton wool spot, Papilledema on fundus examination. There is statistically highly significant association between severity of PIH & hypertensive retinopathy (p 0.000). **Conclusion:** early detection of ophthalmic fundus changes and early management will prevent the adverse maternal and foetal outcome.

Key words: PIH, Hypertensive retinopathy, grade of hypertensive retinopathy.

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Introduction

Toxemia of pregnancy is a old recognized entity for over 2000 years with its known complications and fatality.[1,2,3] Nowadays, a most accepted terminology for the following defined syndrome is “hypertensive disorders in pregnancy” given by American College of Obstetrics and Gynecology.[2,3] It is an important cause of maternal and fetal morbidity and mortality.[4,5,6] Pregnancy induced hypertension (PIH) was classified as gestational hypertension, mild pre-eclampsia, severe pre-eclampsia and eclampsia.

The pathological changes of pregnancy induced hypertension appear to be related to vascular endothelial dysfunction and its consequences. The retinal vascular changes generally, but not always, correlate with the severity of systemic hypertension.

PIH is a 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 oedema and/or proteinuria. Pregnancy induced hypertension (PIH) is one of the most common medical problems in pregnancy, affecting 7–10% of all pregnancies. [7] Ocular involvement in PIH is common and the occurrence rate varies from 30-100% in different studies. [9-12]

The pathological changes of PIH, pre-eclampsia, and eclampsia are related to vascular endothelial dysfunction and the consequences that follow. These include generalized vasospasm and capillary leakage. The present study aimed at grading the retinal vascular changes in patients of pregnancy induced hypertension and to correlate fundoscopic changes in pregnancy induced hypertension.

The retinal vascular changes usually correlate with the severity of systemic hypertension.[10] Fundoscopic findings in PIH include arterio-venous crossing changes, haemorrhages, exudates in retina, exudative retinal detachment, and choroidal infarcts. [11, 12] The most common abnormality seen is a spasm and narrowing of the retinal vessels. [13] Progressive fundal changes in pre-eclampsia indicate worsening of the pathophysiological status and helps in the management. [14]

Aim & Objective

1. Prevalence of hypertensive retinopathy in pregnancy induced hypertension
2. To study the ocular fundus changes in pregnancy induced hypertension.

Material Methods

Study design: A cross sectional study

Study setting: Department of ophthalmology of tertiary care center.

Study population: The study population included all the cases with PIH admitted in OBGY department and referred to ophthalmology department for hypertensive retinopathy and fundus changes such cases were included in the study.

Sample size: 115

Inclusion criteria

1. Patients diagnosed with pregnancy induced hypertension in obstetrics and gynaecology ward and OPD referred to Ophthalmology department.
2. Patients with >20 weeks of gestation age.
3. Patients having clear cornea

Exclusion criteria

1. Patients with pre-existing Hypertension.
2. Patients with Diabetes Mellitus.

3. Patient with renal diseases.
4. Patients with underlying ocular comorbidity like Glaucoma, cataract, corneal opacity.
5. Patients having history of ocular trauma, ocular surgery.
6. Patients with anaemia, connective tissue disorder or vasculitis

Approval for the study

Written approval from Institutional Ethics committee was obtained beforehand. Written approval of Ophthalmology and OBGY department was obtained. After obtaining informed verbal consent from all study participants such cases were included in the study.

Source of study population

Present study was conducted on patients coming to obstetrics and gynecology OPD and Ward and referred to Ophthalmology department at Tertiary Care Centre during time period ofto.....

Sample size

Cochran's formula: $Z^2 \times p \times q / e^2$

Z=1.96; p (Prevalence)=8%, q=100-p, e (allowable error) =5%

$3.84 \times 8 \times 92 / 5 \times 5 = 113.8$

Sample size= 115 cases

Study procedure

All patients fulfilling the inclusion criteria were enrolled in the study after obtaining written informed consent from the parent or guardian

History: Detailed history was taken including onset, duration, and progress of the chief complaints. Demographic details of the patients were tabulated. Any significant past history details were recorded.

General Examination: The vital signs- pulse rate, respiratory rate, blood pressure, and temperature were recorded. Other signs like pallor, cyanosis, icterus, lymphadenopathy, edema, were looked for, by standard clinical examination techniques.

Systemic Examination: A detailed examination of abdomen, respiratory, cardiovascular and central nervous system was carried out and recorded in detail.

Ophthalmic Examination

- Visual acuity was checked using Snellen chart.
- Slit-lamp examination of the anterior segment was done, wherever possible otherwise bedside diffuse torch light examination was done.
- Pupils were dilated using 1% tropicamide eyedrop until full mydriasis.
- Fundus evaluation was done using direct or indirect ophthalmoscope and positive findings were noted on data sheet.

Ophthalmic Examination:

- Head posture, Facial symmetry, Eye alignment, Extraocular movements, Visual acuity

Data Analysis: Data was analyzed and presented in frequency tables and graphs using Microsoft word and Excel. Chi-square test was applied to test statistical significance wherever necessary. Significance is assessed at 5% level of significance and p-value of

Result and observations

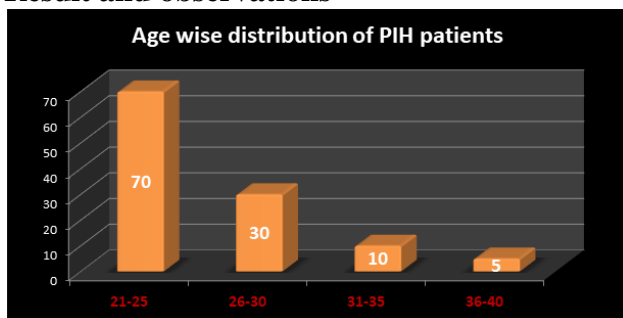


Figure 1: Age wise distribution of PIH patients

Maximum number of PIH patients 70 (60.9%) belonged to age group 21-25 years followed by 30 (26.1%) PIH patients belonged to 26-30 years. About 10(8.7%) PIH patients were belonged to 31-35 years & only 5 (4.3%) PIH patients were aged between 36-40 years.

Table 1: Distribution of patients according to severity of PIH

Severity of PIH	Frequency	Percentage
Mild pre-eclampsia	28	24.35%
Severe pre- eclampsia	82	71.30%
Eclampsia	05	4.35%
Total	115	115 (100%)

Table shows, among 115 PIH patients 82 (71.30%) were had severe pre-eclampsia followed by 28 (24.35%) had mild pre-eclampsia & 5 (4.35%) had eclampsia.

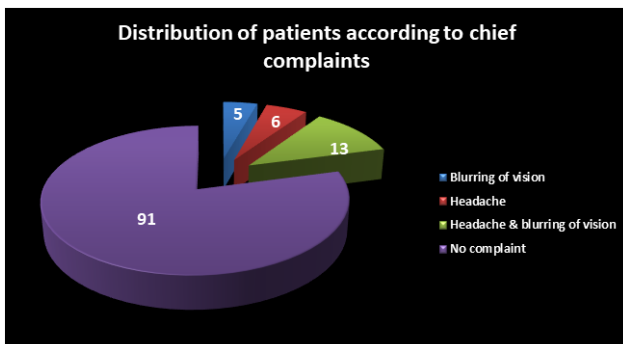


Figure 2: Distribution of patients according to chief complaints

Above figure shows 91 (79.1%) had no any complaint. About 13 (11.3%) had headache & blurring of vision followed by 6 (5.2%) had headache & 5 (4.3%) had blurring of vision.

Table 2: Distribution of PIH patients according to hypertensive retinopathy.

GRADES OF HYPERTENSIVE RETINOPATHY	No. of patients	Percentage
Grade 1 hypertensive retinopathy	45	39.1
Grade 2 hypertensive retinopathy	20	17.5
Grade 3 hypertensive retinopathy	6	5.2
Grade 4 hypertensive retinopathy	2	1.7
No retinal changes	42	36.5

Above table shows, among 115 PIH patients, 42 (36.5%) showed no retinal changes. About 45 (39.1%) showed grade 1 hypertensive retinopathy followed by 20 (17.5%) showed grade 2

hypertensive retinopathy & 6 (5.2%) showed grade 3 hypertensive retinopathy. Only two (1.7%) PIH patients showed grade 4 hypertensive retinopathy

Table 3: Distribution of PIH patients according to fundus findings

Fundus finding	No. of patients	Percentage
Flame shaped haemorrhages, Cotton wool spot, Papilledema	2	1.7
Flame shaped haemorrhages, Cotton wool spot	6	5.2
Focal generalised arteriolar Attenuation	20	17.4
Generalised arteriolar Attenuation	45	39.1
No retinal changes	42	36.5

Above table shows 42 (36.5%) PIH patients had no any retinal changes on fundus finding. The most common fundus finding among PIH patients was generalised arteriolar attenuation 45 (39.1%) followed by focal generalised arteriolar attenuation 20 (17.4%). About 6 (5.2%) PIH patients showed flame shaped haemorrhages, Cotton wool spot & 2(1.7%) PIH patients showed flame shaped haemorrhages, Cotton wool spot, Papilledema on fundus examination

Table 4: Association between severity of PIH & hypertensive retinopathy

Severity of PIH	Grades of hypertensive retinopathy					Total	P-Value
	Grade 1	Grade 2	Grade 3	Grade 4	No retinal changes		
Mild pre-eclampsia	6	10	4	0	8	28	0.000
Severe pre-eclampsia	39	7	1	1	34	82	
Eclampsia	0	3	1	1	0	5	
Total	45	20	6	2	42	115	

Table shows 28 PIH patients had mild pre-eclampsia, out of that 6 had grade 1, 10 had grade 2 & 4 had grade 3 hypertensive retinopathy. About 8 had no any retinal changes in PIH patients with mild pre-eclampsia. 82 PIH patients had severe pre-eclampsia, out of that 39 had grade 1, 7 had grade 2, 1 had grade 3 & 1 had grade 4 hypertensive retinopathy.

About 34 had no any retinal changes in PIH patients with severe pre-eclampsia. 5 PIH patients had eclampsia, out of that 3 had grade 2, 1 had grade 3 & 1 had grade 4 hypertensive retinopathy. There is statistically highly significant association between severity of PIH & hypertensive retinopathy (p 0.000).

Discussion

Age and PIH

Age <20 year is one of the risk factors for PIH. The probable reason for higher incidence of PIH in younger age group could be non-compensatory hypertension. In our study among 115 PIH patients, no one was below 20 years and maximum i.e.70 patients (60.9%) belonged to 21-25 years, 30 (26.1%) belonged to 26-30 years, 10 (8.7%) belonged to 31-35 years while only 5 (4.3%) belonged to 36-40 years. Among 70 patients in age group 21-25 years, 46 (65.71%) showed hypertensive retinopathy.

Age wise incidence of hypertensive retinopathy is, 18 (60%) in 26-30 years, 4 (40%) in 31-35 years, 5 (100%) in 36-40 years. But association between age of patient and hypertensive retinopathy was found not significant.

Age wise incidence of PIH in the study conducted by Reddy SC et al. [15] was 43 (55.12%) in 21-30 years, 30 (38.46%) in 31-40 years, 5 (6.41%) in 41-45 years. And age wise

incidence of hypertensive retinopathy was 26 (60.46%) in 21-30 years, 15 (50%) in 31-40 years, 2 (40%) in 41-45 years.

Ocular manifestations and PIH

Preeclampsia/eclampsia has various ocular manifestations. Blurred vision is the most common visual complaint. The most common ocular finding is focal/generalized arteriolar narrowing. Other common symptoms are photopsia, visual field defects, sudden inability to focus, and in severe cases, complete blindness. [16] In our study among 115 patients 91 (79.1%) had no any complaint. Headache and blurring of vision complained by 13 (11.3%) patients, while only headache complained by 6 (5.2%) and only blurring of vision complained by 5 (4.3%) patients.

In the study conducted by KHANOM R et al. [17], blurring of vision was present in 23 (23%) cases of severe preeclampsia and eclampsia. The visual acuity was normal (6/6-6/9 in both eyes) in 77 (77%) patients.

Severity of PIH

ACOG classified PIH as mild pre-eclampsia, severe pre-eclampsia, eclampsia, HELLP Syndrome. In our study among 115 PIH patients 28 (24.35%) were having mild pre-eclampsia while 82 (71.30 %) were having severe pre-eclampsia and 5 (4.35%) were having eclampsia. Among 28 patients with mild pre-eclampsia 20 (71.42%) had positive retinal changes. While among 82 patients with severe pre-eclampsia 48 (58.36%) had positive retinal changes.

Among 5 patients with eclampsia 5 (100%) had positive retinal changes. So, the severity of PIH and hypertensive retinopathy had highly significant association. In the study conducted by Reddy et al. [15], out of 78 cases of PIH, there are 30 (38.46%) cases of mild pre-eclampsia and 46 (58.97%) cases of severe pre-eclampsia and 2 (2.56%) cases of eclampsia. Among these, 13 cases (43.33%) of mild pre-eclampsia and 31 cases (67.39%) of severe pre-eclampsia and 2 cases (100%) of eclampsia showed positive fundus changes. So, the severity of PIH and hypertensive retinopathy had significant association.

Hypertensive retinopathy and PIH

Different fundus changes in PIH are hypertensive retinopathy and choroidopathy, cystoid macular edema, serous retinal detachment, RPE lesions, retinal arterial occlusions, retinal venous occlusions (very rare), ischemic optic neuropathy, ischemic papillophlebitis, optic atrophy.

The most common fundus changes to be encountered in PIH is hypertensive retinopathy. [18] Hypertensive retinopathy includes focal/generalized arteriolar narrowing, flame shaped hemorrhages, cotton wool spots, retinal edema, disc edema, arteriosclerosis. Cotton wool spots are seen in severe hypertension.[19]

In our study among 115 patients 42 showed no retinal changes, 45 (39.1%) showed grade 1 hypertensive retinopathy, 20 (17.5%) showed grade 2 hypertensive retinopathy, 6 (5.2%) showed grade 3 hypertensive retinopathy and 2 (1.7%) showed grade 4 hypertensive retinopathy. No other fundus changes except hypertensive retinopathy is observed.

So, the prevalence of hypertensive retinopathy is 63.5%. About similar prevalence of hypertensive retinopathy was found in the study conducted by Reddy SC et al. [15] with prevalence of 59%, with grade 1 hypertensive retinopathy 41 (52.6%), grade 2 hypertensive retinopathy 5 (6.4%). Hemorrhages, exudates and retinal detachment were not seen in any of the patients in this study.

Conclusion

Our study concluded that incidence of PIH related hypertensive retinopathy is more in 21-25 years age group, more in above 32 weeks of gestation, and in primigravida. So, early

detection of ophthalmic fundus changes and early management will prevent the adverse maternal and foetal outcome.

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