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Ocular Manifestations in Severe Pregnancy-Induced Hypertension: Insights from a Tertiary Care Center in a Tribal Region

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Abstract

Context: Pregnancy-induced hypertension (PIH) is one of the most common complications of pregnancy and if not recognized early and treated, can seriously affect maternal and child health.

Aim: To determine the prevalence of ocular manifestations in severe PIH and the correlation between ocular changes and blood pressure.

Settings and Design: cross-sectional observational study conducted at tertiary health care centre in tribal area.

Methods and Material: This study conducted over 18 months included 124 patients who met the inclusion criteria and visited a tertiary health care. Data such as age, gravida, and blood pressure were collected from patient case records. Findings of the anterior and posterior segments were documented.

Statistical analysis used: Chi square test

Results: Out of 124 patients with severe PIH, ocular manifestations were observed in 44.35%. Among these, 10.48% exhibited anterior segment changes, while 33.87% showed posterior segment abnormality. Arteriolar narrowing [14.51%] followed by arteriovenous crossing changes [8.87%], and retinal haemorrhages [4.03%] were the frequent retinal findings. Positive correlation was found between ocular manifestations and diastolic blood pressure [P=0.007]. Also, higher grades of proteinuria had more fundus involvement. Conversely, a negative correlation was observed between ocular manifestations and age, parity, gestational age.

Conclusions: Elevated diastolic blood pressure and proteinuria are significant determinant of fundus changes in severe PIH. Interestingly, retinal changes were observed even in asymptomatic patients. Therefore, routine fundus examination should be performed in all pre-eclampsia and eclampsia patients with elevated blood pressure to identify retinal changes early and prevent complications.

Key-words: PIH, hypertensive retinopathy, proteinuria

INTRODUCTION

Pregnancy-induced hypertension (PIH) is a common pregnancy complication affecting 5-10% of pregnancies worldwide and is one of the leading causes of maternal and perinatal morbidity and mortality.[1] PIH encompasses a spectrum of hypertensive disorders, including gestational hypertension, preeclampsia, and eclampsia, characterized by elevated blood pressure and systemic endothelial dysfunction after 20 weeks of gestation.[2] Among these, severe preeclampsia and eclampsia pose a greater risk of systemic complications, including neurological, renal, hepatic, and ocular manifestations. Ocular involvement in severe PIH is not only common but also clinically significant, as it often reflects the severity of systemic disease. These manifestations result from the interplay of vasospasm, increased vascular permeability, and ischemia secondary to endothelial dysfunction, which primarily affects the retinal and choroidal vasculature.

PIH is four times more common in primipara women than multipara and is associated with ocular involvement in 30-100% of cases.[3,4,5] Papilledema or detachment of the retina are the warning signs for the termination of pregnancy to save the vision and also to prevent further pathological changes in the arterioles of the other organs in the body.[6] Although ocular changes in PIH are often transient and reversible postpartum, their presence can be indicative of poor maternal and fetal prognosis. Recognizing these manifestations is essential for early intervention, effective management, and prevention of permanent visual impairment. This study aims to assess the prevalence of ocular manifestations in severe PIH and their correlation with blood pressure to develop effective screening and management protocols for tribal areas.

MATERIALS AND METHODS:

This hospital-based, cross-sectional observational study was conducted over a period of 18 months at a tertiary health care centre located in a tribal area. The study population included all patients who fulfilled the diagnostic criteria for severe pregnancy-induced hypertension (PIH) and were admitted to the Obstetric ward of the health care centre during the study period. Prior to participation, informed written consent was obtained from all patients. A comprehensive general history was recorded, including demographic details, obstetric history, and relevant medical information. The study followed the ethical standards of the Committee on Human Experimentation, and approval was obtained from the Institutional Ethical and Research Committee.

Pregnant women diagnosed with severe PIH, with a singleton pregnancy between 20 weeks and term, no known fetal congenital anomalies, and who have provided informed written consent included in the study. Exclusion criteria included pregnant women who did not consent to participate, those with hazy ocular media, diabetes mellitus, chronic hypertension, peripheral vascular disease, connective tissue disorders, renal disease, multiple gestation, or coexisting conditions such as tuberculosis, ovarian cysts, or fibroids.

A thorough ocular examination was performed evaluating the anterior segment of the eye using a torchlight. For posterior segment evaluation, fundus examination was conducted using both direct and indirect ophthalmoscopes. To facilitate fundus examination, the pupils were dilated using 1% tropicamide eye drops. Any observed fundus changes were documented.

Additionally, patient-specific data, such as age, gravida status, blood pressure measurements, and the presence of proteinuria, were collected from their medical records for further analysis. The results obtained from the study were presented in terms of frequencies and percentages to identify the prevalence and patterns of fundus changes in PIH patients, as well as any associations with clinical and demographic variables. The sample size was calculated using the following formula for estimating proportions:

$n = Z^2P(1-P)/d^2$

Where:

Z = statistic for a level of confidence,

n = Sample size,

P = Expected prevalence or proportion (If the expected prevalence is 20%, then P=0.2), and d= Precision (If the precision is 5%, then d=0.05).

RESULTS

124 cases of severe pregnancy induced hypertension (PIH) were studied. The mean age was 31.28 (SD 4.52) and the mean gestational age Was 32.92 (SD 4.14). The mean systolic BP and diastolic BP were 169.51mm Hg (SD 7.10) and 113.00mm Hg (SD 4.06) respectively. There were 53 primigravida and 71 multigravidas. Distribution of cases based on demography is given in tables below.

Table 1: Distribution of subjects according to age.

Age group	Ocular manifestations	
	Absent	Present
21-25yrs	4	3
26-30yrs	27	21
31-35yrs	20	18
36-40yrs	18	13

The mean age of patients with ocular manifestations and without ocular manifestations was statistically not significant [P=0.97] from Chi square test.

Table 2: Distribution of subjects according to gestational age.

Gestational age	Ocular manifestations	
	Absent	Present
<28 weeks	11	9
28-32weeks	19	20
33-37weeks	19	15
>37weeks	20	11

The gestational age of patients with ocular manifestations and without ocular manifestations was statistically not significant [P=0.625] from Chi square test.

Table 3: Distribution of subjects according to parity

Parity	Ocular manifestations	
	Absent	Present
Primigravida	28	25
Multigravida	41	30

As per the Chi square test, parity [P=0.58] did not show a significant correlation with the presence of Ocular manifestations.

Table 4: Distribution of subjects according to SBP.

SBP	Ocular manifestations	
	Absent	Present
161-169	21	8
170-179	35	30
>180	13	17

SBP [P=0.07] was statistically not significant with Ocular manifestations.

Table 5: Distribution of subjects according to DBP.

DBP	Ocular manifestations	
	Absent	Present
111-119	25	10
120-129	34	25
>130	10	20

DBP was statistically significant with Ocular manifestations with P value of 0.007.
Out of 58 patients of ++ proteinuria, 20 patients showed ocular findings and 35 patients showed +++ proteinuria out of 66 patients. Higher grades of proteinuria had more fundus involvement.

Table 6: Distribution of subjects according to systemic symptoms

Systemic symptoms	No. of pts.
Epigastric pain	5
Headache	20
Nausea	6

Table 7: Distribution of subjects according to ocular symptoms

Ocular symptoms	No. of pts.
Blurred Vision	50
photopsia	1
diplopia	3
headache	3
Transient loss of vision	8

Ocular symptoms were present among 65 patients [52.41%] given in above table.
Anterior segment findings were observed among 13 patients [10.48%]. These were lid oedema among 4 patients [3.22%], chemosis among 1 patient [0.80%], conjunctional congestion among 2 patients [1.61%] and sub-conjunctional haemorrhage among 6 patients [4.83%].
Posterior segment findings were present in 42 patients [33.87%].

Table 8: Distribution of subjects according to Posterior segment findings

Posterior segment findings	Percentage	No. of patients with findings
Arteriolar narrowing	14.51%	18
AV crossing	8.87%	11
Cotton wool spots	3.22%	4
Retinal haemorrhage	4.03%	5
Papilledema	1.61%	2
Macular oedema	0.80%	1
Retinal detachment	0.80%	1
Choroidal infarct	0	0

DISCUSSION

Ocular changes during pregnancy are often benign physiological adaptations to metabolic, hormonal, and immunological changes; however, variations in retinal vasculature can serve as reliable indicators for assessing the severity of hypertension and distinguishing between chronic hypertension and PIH.

Our study observed gestational age group between 28 and 32 weeks, with a mean gestational age of 32.92 weeks [SD 4.14]. Multiparous women outnumbered primigravida in the study, though parity and gestational age showed no significant correlation with ocular findings. Among the 124 subjects, 65 [52.41%] had ocular symptoms, 31 [25%] reported systemic symptoms, and 42 [33.87%] exhibited posterior segment changes. The systemic symptoms observed included headache, epigastric pain, and nausea.

ElluruPanduRangaiah et al have found no association between fundus findings and the parity. Of the 62 primigravida, (37.1%) had normal fundus, and (62.9%) cases had abnormal fundus. (47.3%) cases of the 38 multigravidas had normal fundus, and (52.6%) cases had abnormal fundus.[7]In our study also parity and gestational age showed no significant correlation with ocular finding.

The present study observed higher grades of proteinuria had more fundus involvement consistent with findings by Devaru et al. and Bhandari et al., but contrasting with studies by Mithila et al., Indu et al., and Uma et al., which reported no such relationship.[8-12]

A study by Induet al.[10]reported that 40% of cases exhibited arteriolar narrowing, followed by 12.7% with macular oedema, 4% with arteriovenous crossing changes, 1.3% with cotton wool spots, 2% with retinal haemorrhages. In our study also most common posterior segment finding were arteriolar narrowing [14.51%] followed by arteriovenous crossing changes [8.87%], and retinal haemorrhages [4.03%], Cotton wool spots [3.22%].

Studies done by Bhandari et al., Indu et al., and Mackensenet al.[13] mentioned that severe grades of retinopathy were associated with elevated levels of blood pressure. In our study, patients with systolic blood pressure above 170 mmHg and diastolic pressure exceeding 120 mmHg exhibited a higher prevalence of ocular findings. This study suggests DBP was a good indicator for severity of ocular manifestations as compared to SBP. Additionally, the degree of proteinuria appeared to align with the severity of ocular involvement, as 35 patients with +++ proteinuria demonstrated significant findings.

These findings emphasize the importance of regular ocular examinations in patients with severe PIH to monitor and manage complications promptly and essential for both maternal and fetal ultimate outcomes. There have been multiple studies on PIH and ocular finding, but corelation of solely the severe PIH patients and ophthalmic manifestations has never been examined or documented also there is lack of data for tribal area.

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