



ORIGINAL RESEARCH PAPER

Ophthalmology

OCULAR MANIFESTATIONS IN HYPERTENSIVE DISORDERS OF PREGNANCY

KEY WORDS:

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ABSTRACT

Pregnancy-induced hypertension (PIH)—encompassing pre-eclampsia and eclampsia—occurs in about 10–15% of pregnancies and can precipitate significant ocular changes ranging from physiological to sight-threatening pathology. In a one-year cross-sectional study (July 2023–July 2024) at a tertiary care centre in Southern Assam, 100 women (91 with pre-eclampsia and 9 with eclampsia), aged 21–40 (mean around 30 years), at a mean gestational age of 36.5 weeks (70% between 28–34 weeks), were evaluated after excluding those with prior systemic or ocular conditions. Routine obstetric data—blood pressure, proteinuria—and ophthalmic evaluations—including visual acuity, intraocular pressure, anterior segment examination, and dilated funduscopy—were performed. PIH severity was classified per standard definitions: mild (BP >140/90 mmHg, + proteinuria), severe (>160/110 mmHg, +++/+++ proteinuria with systemic symptoms), and eclampsia (onset of convulsions). Results showed mean BP of 155/97 mmHg, with proteinuria distributed as 70% '+', 10% '++', and 20% '+++'. Ocular symptoms appeared in 20% of severe pre-eclampsia and all eclampsia patients, predominantly headaches (50%) and blurred vision (24.7%). Anterior segment changes (congestion, haemorrhage, chemosis, oedema) were noted in 12%, always alongside posterior involvement. Fundus abnormalities were present in 47% overall (100% of eclampsia, 38% of pre-eclampsia), exclusively in those with BP >160/110 mmHg, and included arteriolar narrowing (17%), arteriovenous crossing changes (12%), retinal haemorrhages (9%), cotton-wool spots (6%), and papilledema (3%). These findings confirm that hypertensive retinopathy correlates with PIH severity and underscore the importance of routine fundus examination to guide management and prevent vision-threatening complications.

INTRODUCTION

Pregnancy is associated with ocular changes, which most often are transient in nature. Either preexisting conditions exacerbate it or may be associated with development of new conditions.

The ocular effects of pregnancy can be either physiological or pathological. A very important pathologic entity, associated with a wide spectrum of ocular changes is hypertensive disorders of pregnancy.

- Pregnancy-induced hypertension (PIH)—a term encompassing gestational hypertension, preeclampsia, and eclampsia—affects approximately 10–15% of pregnancies globally^[1]. Poorly managed case of preeclampsia / eclampsia can also result in irreversible blindness. Hypertensive disorders of pregnancy account for a great deal of foetal morbidity (acute and long-term), perinatal deaths, preterm birth and foetal growth restriction (FGR).

Aim

To evaluate the ocular manifestations in women with pregnancy induced hypertension and its direct association with the severity of the condition for better management.

MATERIALS AND METHODS

This was a hospital based descriptive cross-sectional study conducted for a period of 1 year from July 2023 to July 2024 in

tertiary care centre in Southern Assam.

Inclusion Criteria: All diagnosed cases of eclampsia and pre-eclampsia admitted in the obstetric ward willing to participate were included.

Exclusion Criteria: Patients with previous history of Diabetes Mellitus, Hypertension, Renal disease, Infectious disease, thyroid disease, HIV, haematological disorders, ocular trauma and ocular diseases prior to pregnancy were excluded from this study. Also, patients unwilling to participate were excluded.

Study Procedure

After a brief obstetric history, an ocular history was also recorded. Case notes were reviewed and obstetric details such as age, parity, gestational age, blood pressure, and proteinuria scores were recorded. The ophthalmological examination included visual acuity testing using a Snellen's chart and a pinhole was used to assess the visual acuity. The intraocular pressure was measured under topical anaesthesia with Schiotz tonometer.

The anterior segment examination was done using a torch. Fundoscopy was performed with a head-mounted indirect ophthalmoscope with 20 dioptres after pupil dilatation with tropicamide 0.8% and phenylephrine 5%. All the data collected were documented in the data sheet.

Pregnancy-induced hypertension severity was classified into pre-eclampsia (mild and severe) and eclampsia, as described in the following paragraph. Mild pre-eclampsia was defined as a blood pressure greater than 140/90 mmHg, + proteinuria, and/or mild leg oedema. Severe pre-eclampsia was defined as blood pressure greater than 160/110 mmHg, ++ or +++ proteinuria, headache, cerebral or visual disturbances, epigastric pain, impaired liver function tests, and increased serum creatinine^[2,3]. Eclampsia was defined as severe pre-eclampsia superseded by convulsions. For purpose of dipstick quantification of proteinuria, a single '+' correlates to 30mg/dL, '++' correlates to 100mg/dL, and '+++ correlates to 300mg/dL^[2,3].

RESULTS

The distribution of subjects according to different variables like age, gestational age, parity, pregnancy induced hypertension, blood pressure, proteinuria, ocular symptoms, systemic symptoms, anterior segment findings, fundus changes, and hypertensive retinopathy classification is shown in Table 1 and depicted in consecutive figures and accompanying text.

A total 100 patients were included in this study with pregnancy induced hypertension among which 91 patients diagnosed with pre-eclampsia and 9 patients with eclampsia. The majority of the patients were in the 26-30yrs age group, youngest and oldest being 21yrs and 40yrs respectively.

Gestational age was divided into four groups: The highest number of patients were from the group of 28 – 34 weeks (70%), and only 2% were from the group of 24–28 weeks, with a mean gestational age of 36.5 weeks.

Most of the subjects in our study population were primigravida (64%), whereas 36% were multigravida.

Highest systolic BP was 190 and diastolic BP 140mmHg with mean SBP 155mmHg, while mean DBP was 97mmHg. '+' proteinuria was recorded in 70 (70%) of participants, '++' proteinuria was recorded in 10 (10%), '+++ proteinuria was recorded in 20 (20%).

Ocular symptoms were present in 20% of severe pre-eclampsia and 100% of eclampsia. Most common impending symptoms noted headache (50%) followed by blurring of vision (24.7%).

Out of 100 patients only 12 patients had anterior segment findings and those with anterior segment findings also had posterior segment findings. Among the anterior segment findings 4 had conjunctival congestion, subconjunctival haemorrhage and chemosis were seen in 3 cases each and lid edema was seen in 2 cases.

Fundus changes were seen in 47% of the study population. This included all patients who had eclampsia and 38% of pre-eclampsia cases. All patients with fundus changes had blood pressure greater than 160/110mmHg.

Arteriolar narrowing, arteriovenous crossing changes, cotton wool spots, retinal haemorrhages and papilledema were analysed. Arteriolar narrowing was the most common finding on fundus examination. It was seen in 17% of the patients. The second common finding was arteriovenous crossing changes seen in 12% of the cases followed by retinal haemorrhage (9%), cotton wool spots (6%) and papilledema (3%).

Table 1: Comparison Of Different Variables

Variables	Sub Category	Number of subjects (%)
Age (years)	21-25	10 (10%)
	26- 30	57 (57%)
	31-35	15 (15%)

	36-40	18 (18%)
	Mean	
Gestational Age(weeks)	24- 28	2 (2%)
	28-34	70 (70%)
	34-37	17 (17%)
	>37	11 (11%)
	Mean	
Parity	Primigravida	64 (64%)
	Multigravida	36 (34%)
Status	Eclampsia	9(9%)
	Moderate Preeclampsia	50(50%)
	Severe Preeclampsia	41(41%)
Proteinuria	+	70 (70%)
	++	10(10%)
	+++	20(20%)
Ocular symptoms	Blurred vision	24 (24%)
	Photophobia	2 (2%)
	Diplopia	2(2%)
	Headache	50 (50%)
	Intermittent loss of vision	10 (10%)
	Ocular pain	10(10%)
Systemic symptoms	Epigastric pain	70 (70%)
	Nausea	20 (20%)
	None	10(10%)
	Anterior segment findings	Chemosis
Fundus changes	Conjunctival congestion	4 (4%)
	Lid edema	2 (2%)
	Subconjunctival Haemorrhage	3 (3%)
	None	88 (88%)
	Arteriolar narrowing	17 (17%)
	Arteriovenous crossing changes	12(12%)
Hypertensive retinopathy	Cotton wool spots	6 (6%)
	Retinal haemorrhages	9(9%)
	Papilledema	3 (3%)
	None	53 (53%)
Hypertensive retinopathy	Grade 1	20(20%)
	Grade 2	15 (15%)
	Grade 3	9(9%)
	Grade 4	3 (3 %)
	Nil	53(53%)

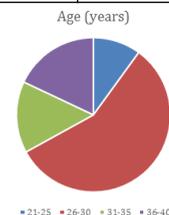


Figure 1: Distribution of subjects according to age

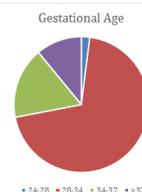


Figure 2(a)

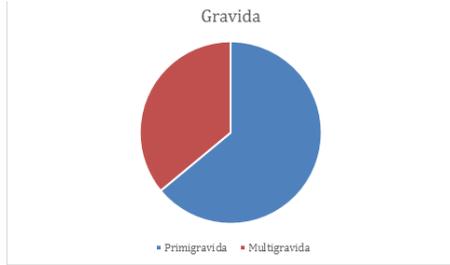


Figure 2(b)
Figure 2: Distribution of subjects according to (a) gestational age and (b) parity

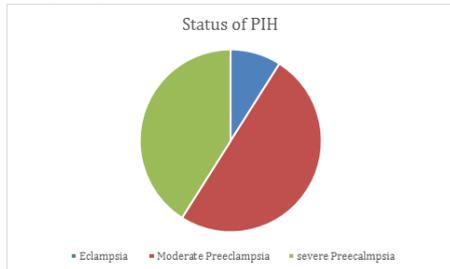


Figure 3: Distribution of subjects according to status of PIH

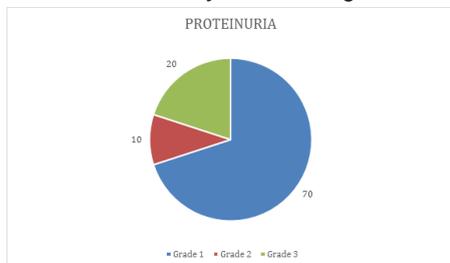


Figure 4: Distribution of subjects according to proteinuria

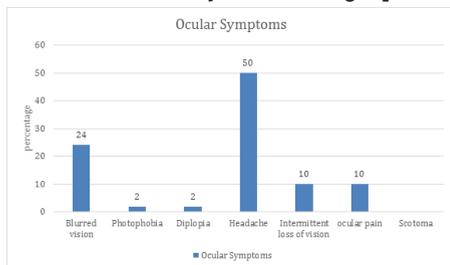


Figure 5(a)

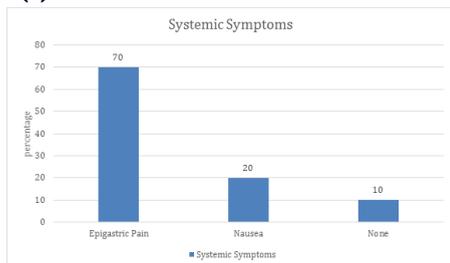


Figure 5(b)
Figure 5: Distribution of subjects according to (a) ocular symptoms and (b) systemic symptoms

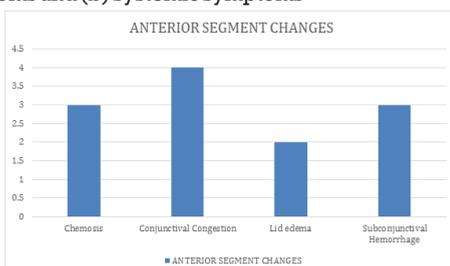


Figure 6(a)

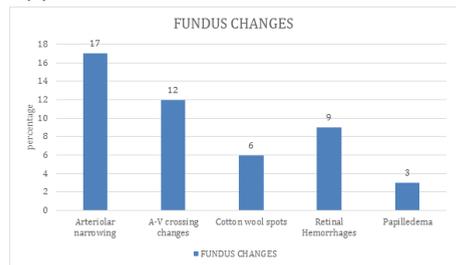


Figure 6(b): Distribution of subjects according to (a) anterior segment changes and (b) fundus changes

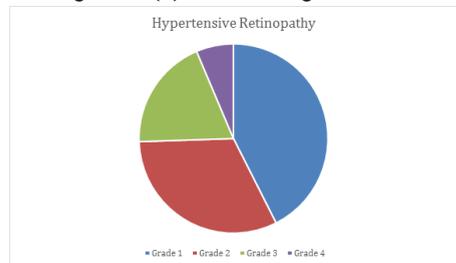


Figure 7: Distribution of subjects according to hypertensive retinopathy as per the Keith-Wagener-Barker grading system

DISCUSSION:

PIH is a multiorgan hypertensive disorder that is one of the leading causes of maternal mortality, particularly in developing countries. Increasing awareness of its complications among both the medical fraternity and the general population has helped in reducing both morbidity and mortality. The ocular system is one of the main organs to be affected, and the severity of the retinal changes increases with the severity of PIH.

The Study Has Brought The Following Points To Light:

- Headache and blurred vision were the most common impending symptoms. The results of the present study were consistent with a study done on the Indian population by Bhandari et al^[4] and Chandran et al^[5].
- There was a predominance of multigravida over primigravida. Maximum cases were detected in third trimester.
- All eclamptic women had symptoms whereas 20% preeclampsia patients complained of symptoms. Samra et al. found that symptoms occur in about 25% preeclampsia and 50% eclampsia patients^[6].
- 12 patients had anterior segment changes along with posterior segment changes.
- Out of 47% fundus changes, all eclamptic patient had fundus changes whereas only 38% pre eclamptic patients had fundus changes. Some studies report the incidence of retinopathy may be as high as 85% in cases of pregnancy hypertension. Dasgupta et al. ^[6] found this incidence to be 49%, and Sudha et al. ^[7] found the same to be 53.29%. A few studies showed lower prevalence as in Manpreet Kour et al. where the fundus changes were seen in only 31.11% patients^[8].
- All patients with fundus changes had blood pressure greater than 160/110mmhg, proteinuria and higher creatinine level. But similar results were observed by Bhandari et al. and Varija et al. who quoted that severe grades of retinopathy are seen with increase in BP and increasing grades of proteinuria^[4].
- Majority of the fundus findings were seen in the form of arteriolar narrowing and arteriovenous crossing changes. A study done by Bhandari et al. ^[4] found arteriolar attenuation in 44% of cases followed by macular oedema in 12% of cases and exudative retinal detachment in 7% of cases.

CONCLUSION

Ocular involvement with fundus changes is quite common in patients with pre-eclampsia and eclampsia. Retinal vascular changes are hallmark of hypertensive disorders of pregnancy with increasing severity in severe preeclampsia/eclampsia. Even asymptomatic patients can have changes on fundus examination reiterating the importance of routine retinal examination. Though ocular involvement is quite common but it's rarely being investigated. Observing retinal vasculature may provide clue to status of vessels in other parts of body including placental circulation greatly assisting diagnosis and prompt treatment. Early fundus screening in patients with PIH not only helps detect changes in the retina but also serves as a guide to detect similar changes in other organs of the body including the placental circulation, greatly assisting diagnosis and prompt treatment. Obstetricians should seek for routine fundal examinations by ophthalmologists in all pre-eclampsia and eclampsia patients in view of foetal and maternal well-being.

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