STUDY ON OCULAR CHANGES IN PRE-ECLAMPSIA AND ECLAMPSIA IN A TERTIARY CARE TEACHING HOSPITAL IN BIHAR

Gynaecology

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ABSTRACT

Pre-eclampsia and eclampsia are hypertensive disorders of pregnancy which involve multiple organ systems including eye and CNS. Endothelial dysfunction associated with the disease affects retinal vasculature leading to visual disturbance. A prospective, observational study conducted at Patna Medical College Hospital, Patna, Bihar between October 2018 to September 2019. The aim was to assess the ocular changes and associated visual deficit in patients of pre-eclampsia and eclampsia and to evaluate possible residual visual symptoms during the follow-up period of 6 weeks after termination of pregnancy. The study included 200 patients of pre-eclampsia and eclampsia. None of the patients had history of use of glasses, any previous ocular complaints or significant treatment history for ocular problems. Visual disturbance was complained by 43 patients. A thorough ocular evaluation was performed by a trained team of ophthalmologists. Patients were treated according to NICE guideline given for managing gestational hypertension. Repeat fundoscopy was performed after 2 weeks of pregnancy termination. The mean duration between onset of visual symptom to hospital consultation was 7-10 days. Although permanent impairment of vision is rare, emergency providers in rural areas should be taught about visual symptoms arising in pregnancy and for referral services. Obstetricians should be conscious of possible eye changes and should consult ophthalmologist for diagnostic options. Fundoscopy is a simple but effective procedure to detect ocular changes in asymptomatic patients and may help in initiating treatment and preventing complications. Women and families must be stressed upon for regular antenatal care.

KEYWORDS

Pre-eclampsia, fundoscopy, ANC

INTRODUCTION:

Pre-eclampsia is a multisystem disorder that affects 2-5% of pregnant women and is one of the leading causes of maternal and perinatal morbidity and mortality.^[1] According to International Society for the Study of Hypertension in Pregnancy (ISSHP) preeclampsia is defined as blood pressure $\geq 140/90$ mm of Hg on at least two occasions measured 4 hours apart in previously normotensive women at or after 20 weeks of gestation and is accompanied by one or more of following new onset conditions: 1. Proteinuria (i.e. ≥ 30 mg/mol protein: creatinine ratio; ≥ 300 mg/24 hour; or $\geq 2+$ dipstick); 2. Other maternal organ dysfunction, including acute kidney injury (AKI) (creatinine ≥ 90 μ mol/L; 1 mg/dL), liver involvement (elevated transaminases e.g. ALT or AST > 40 IU/L) with or without right upper quadrant or epigastric abdominal pain), neurological complications (examples include eclampsia, altered mental status, blindness, stroke, clonus, severe headaches, persistent visual scotomata) haematological complications (thrombocytopenia –plateletcount below 150,000/ μ L, DIC, hemolysis); 3. Uteroplacental dysfunction (such as fetal growth restriction, abnormal umbilical artery Doppler wave form analysis, or stillbirth).²

Preeclampsia is considered a systemic vascular disorder where both hypertension and proteinuria implicate the endothelium as the target of the disease.^[3] Here, the refractoriness to vasoactive agents is lost first followed by the loss of vasoconstriction, which results in a decrease in intravascular volume, which in turn, shunts to the extravascular space. There is also an imbalance between proangiogenic and antiangiogenic factors.³

Ocular involvement occurs in a majority of patients of preeclampsia. Ocular examination of eclamptic patients not only helps in diagnosis of eye problems but repeated observations assist in assessing the severity and progression of disease, response to treatment and ultimate outcome or prognosis. The Ophthalmoscope can easily detect the pathological changes in the fundus and the retinal blood vessels in particular that reflect the effect of hypertension throughout the vascular system.^{4,5,6,7}

Sometimes visual problem is the 1st symptom of pre-eclampsia, that a patient does notice. Recognition of visual symptoms and ocular examination is important as this can be a sign of cerebral edema. Usually visual complaints resolve completely but rarely, extensive cerebral infarctions may result in total or partial visual defects. Vision can be permanently impaired in case of retinal artery occlusion.^{8,9}

AIM AND OBJECTIVE:

Aim of this study was to evaluate the ocular changes in patients of pre-

eclampsia and eclampsia and to assess the visual recovery during a follow up period of 6 weeks after termination of pregnancy.

MATERIAL AND METHOD:

A prospective, observational study was conducted at Patna medical college hospital, Patna, a tertiary health care centre in Bihar, India, between October 2018 to September 2019. The study was conducted after getting clearance from departmental ethical committee and after getting written consent from the participants.

The study group included two hundred women of gestation hypertension with clinical criteria of preeclampsia and eclampsia, as defined by ISSHP.²

Patients with history of pre-existing hypertension and convulsions, patients with pre-eclampsia or eclampsia superimposed on chronic hypertension, and patients having other systemic diseases, such as diabetes mellitus, thyroid disorders, haematological disorders were excluded. Patients in unconscious state were also excluded. Patients with any previous ocular complaints or any significant history of treatment for ophthalmic problem were excluded from study.

The study group were divided into different subgroups for the ease of evaluation:

- Group A- Preeclampsia with blood pressure 140/90-159/109mmHg
- Group B- Preeclampsia with blood pressure 160/110mmHg and more
- Group C- Eclampsia

A detailed ophthalmic evaluation was performed for all the patients by trained ophthalmologists. Direct as well as indirect ophthalmoscopy was used for examination of fundus after full dilatation of pupil with topical Tropicamide eye drops. Ocular findings hypertensive retinopathy of each patient recorded and graded according to Keith-Wagner-Barker classification.¹⁰

All the patients of preeclampsia and eclampsia received treatment according to NICE guidelines.¹¹ Labetalol, oral or intravenous, was used as antihypertensive of choice, and nifedipine if labetalol not suitable.¹⁰ In severe cases of preeclampsia and eclampsia a loading dose of 4 g of magnesium sulfate was given intravenously followed by an infusion of 1g per hour for 24 hours.¹¹ None of the patients received any treatment for the complaint of visual disturbance. Follow up examination was done at 2 weeks and 6 weeks after termination of the pregnancy.

Data were analysed using computer software MS Excel 2019. The patient's characteristics were reported as percentages or mean $\pm$

standard deviation (SD) as deemed appropriate.

RESULT:

The study group included 200 patients of pre-eclampsia and eclampsia. In these patients 38 had blood pressure lower than 160/110mmHg, 120 had severe hypertension more than 160/110mmHg and 52 had eclampsia. The gestational age at time of presentation varied between 26 to 39 weeks of pregnancy.

The age of the patients included in study was between 18-41 years. Mean age of patients in our study was 23.28 years. 74 % patients were below 27 yrs. The fundus changes in the eye were seen more in younger age group than the older ones. 54.05% [40/74] of patients in 18-22 years age group had ocular changes, in 23-27 years age group it was 51.61% [32/62], 28-32 years age group had 38.63% [17/44] while it was 2 % [3/15] and 20% [1/5] of patients in 33-37 and more than 37 years of age group respectively.

Majority of the patients were primigravida 60% [120/200]. 46 patients were 2nd gravida, 10 patients were 3rd gravida and 24 were pregnant for the fourth time or more. Only 15% of patients had regular antenatal check-up (ANC). Hospital visit was only once in 65, while no ANC in 125 patients.

Patients with complaint of visual problem were 43 (21.5%). Blurring of vision was present in 37, scotomata in 4, and complete blindness in 2 patients. These patients sought out consultation only after onset of symptoms. Some consulted only on progression of symptoms as they were told in family that visual problems occur normally in some pregnancies.

Onset of symptoms (headache or blurring of vision) to hospital visit interval was 7-10 days. There was remarkable improvement in ocular changes after two weeks of termination of pregnancy. Visual symptoms resolved in all patients.

Table 1 Distribution Of Retinal Changes According To Severity (modified Keith Wagner Classification)

Retinal changes	Preeclampsia (n=12) BP 140/90-159/109mmHg	Preeclampsia (n=144) BP 160/110mmHg or more	Eclampsia (n=44)
No change	10	24	4
Group 1 Slight constriction of retinal arterioles	2	40	16
Group 2 Group 1 + focal narrowing of retinal arterioles + AV nicking	0	60	16
Group 3 Group 2 + flame-shaped haemorrhages + cotton-wool spots + hard exudates	0	16	4
Group 4 Group 3 + optic disc swelling	0	4	4

Arteriolar narrowing was found in 2 patients of group A, 100 patients in group B and 32 in group C. Retinal haemorrhage or cotton wool spots seen in 12 patients. Arteriolar narrowing with hard exudate was found in 16 cases of preeclampsia group B and 4 cases of eclampsia. Macular edema was found in 4 and 3 patients in group B and C respectively. Papilledema was found in 1 patient of eclampsia.

DISCUSSION:

In gestational hypertension there is a widespread endothelial dysfunction due to release of excess quantities of the antiangiogenic factors. Decreases in the production of endothelial-derived relaxing factors, such as nitric oxide and prostacyclin, increase production of endothelin and thromboxane, and enhanced vascular reactivity to angiotensin II in women with preeclampsia results in hypertension, proteinuria, and other systemic manifestations of preeclampsia.^{5-7,12}

The retinal vascular changes correlate with severity of hypertension. Retinal vascular changes progress with increase in severity of PIH⁶ and may help as a guideline for termination of pregnancy as they may reflect ischaemic vascular changes in placenta too.⁷

Mean age of patients in our study is 23.28±10.48 years. Below 27 yrs were 74% patients. Fundal changes were seen more in younger age group, 54.05% and 51.61% respectively in 18-22 and 23-27 years. In study of Bhandari et al, Cases having fundus changes were 44%. Mean age of the cases in the study was 23.85 ± 6.58 years. In a prospective cohort study conducted by Karki et al, mean age group of patients with retinal changes was 23.86 ± 5.51 years and without retinal changes was 24.36 ± 5.65 years. In prospective study conducted by Shukla et al, 60% cases aged < 25 years. Mean age-group of patients in the present study matches with the studies by Bhandari et al, Karki et al., and Shukla et al.^{13,14,15} In our study 40 % patients had headache while visual symptom was found in 21%. Most common symptom was blurring 86.04% [37/43]. This is comparable to 35% and 14 % respectively in study of Dr Mithila R et al.

In our patients 29% had grade 1 hypertensive changes ,38% had grade 2 changes,10% grade 3 and 4% grade 4 changes. In study of Mithila R et al, it was 34% and 13% of grade 1 and 2 changes respectively.¹⁶

Bhandari et al had 29% grade 1, and 5 % in grade 2.¹³ Retinal changes were noted in 46 (59%) patients, grade I in 41 (52.6%) and grade II in 5 (6.4%) patients in study of Reddy et al.¹⁷

Majority of patients had arteriolar narrowing (67%) which is supported by study of Hallum, Bhandari et al and Mithila R et al, where arteriolar constriction was about in 60% patients^{8,13,14}

Presence of haemorrhage and cotton wool spots were found in 8% and 2% group B and C respectively. Reddy et al found 3 % of cases. Retinal edema in our patients was 8%. Reddy et al¹⁷ found in 23% of cases. Hard exudates in retina may indicate albuminuric retinopathy and possibility of kidney damage.

There was one case of papilledema in eclampsia patient. The visual prognosis for retinal changes is excellent is excellent in most cases because of its nature and high rate of spontaneous recovery which occurs in a few weeks (hastened after delivery with the absorption of fluid by Retinal pigmentary epithelium.¹⁸ In our study ocular changes recovered in 90.12% of patients (146/162 having various changes) after 2 weeks. Six weeks postpartum no patient had residual ocular changes.

Because most of the visual disturbances tend to reverse during the postpartum period, the overall prognosis is good for preeclamptic patients. However, the onset of ophthalmic changes in a pregnant patient may herald the onset of seizures and should be evaluated.

Blurring of vision was most common symptom. After termination of pregnancy it returned to normal in 100% of patients. This is supported by study of Khanom R et al^{11,17} where out of 23 patients only 5 had visual im.

CONCLUSION:

Ocular fundal changes could be initial finding in asymptomatic patients of pre-eclampsia and eclampsia who may require immediate management. Fundoscopy is a simple non-invasive and cost-effective procedure and may play crucial role in early diagnoses of complications of severe preeclampsia and therefore, in reducing maternal and foetal morbidity. Although permanent visual impairment is rare, emergency care providers in rural areas should be taught about significance of visual symptoms and stress must be given on earliest referral of the patients to higher speciality centres. They must be aware that often these are the first indicators of severe preeclampsia and eclampsia. Obstetricians should also be conscious of possible eye changes and should consult ophthalmologist for different diagnostic options. Women and families must be educated and highly stressed upon the importance of regular antenatal care.

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