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A STUDY OF PREVALENCE OF HYPERTENSIVE RETINOPATHY CHANGES IN PREGNANCY INDUCED HYPERTENSION AT TERTIARY CARE HOSPITAL

Ophthalmology

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ABSTRACT

Retina is the only site in human body where blood vessels can be visualized directly with the help of an Ophthalmoscope. As hypertension has its effects on all the vessels of human body, retinal examination and assessment of vascular changes in pregnant women can provide valuable information about the status of placental circulation and fetal well being . This study was undertaken to determine the prevalence of retinal changes in PIH and association between the retinal changes and blood pressure, proteinuria and severity of the disease.

KEYWORDS

INTRODUCTION

Hypertension is most common medical disorder during pregnancy affecting 6-8% of all pregnancies. [69] Hypertensive disorders in pregnancy are a major cause of maternal and foetal morbidity and mortality. [23] It is amongst the leading causes of maternal deaths in developing countries. [26] Currently hypertension during pregnancy is classified into 4 categories - chronic hypertension, gestational hypertension, pre-eclampsia -eclampsia and pre-eclampsia superimposed on chronic hypertension.

Pregnancy Induced Hypertension (PIH) is defined as an elevated blood pressure of ≥ 140/90 mm Hg recorded at rest on two different occasions and emerging after 20 weeks of pregnancy.

The most common fundus finding in such patients is attenuation of small retinal blood vessels especially arterioles. These vascular changes are reversible, and the resultant signs and symptoms resolve after delivery. The potential complications of hypertensive retinopathy in pregnancy are development of central serous chorioretinopathy (CSCR) and serous retinal detachment. Retinal blood vessels can be visualized directly with the help of an Ophthalmoscope.

Retinopathy is most common manifestation of hypertension which develop due to acute and chronic elevation of blood pressure. The initial response to elevated blood pressure is vasospasm and increase in vasomotor tone, with consequent narrowing of retinal arteries to control optimal blood volume (vasoconstrictive phase) [40]. Persistently elevated blood pressure leads to sclerotic phase which manifest pathologically as intima thickening, media wall hyperplasia and hyaline degeneration, diffuse and focal (localized) retinal arteriolar narrowing.

With chronically sustained blood pressure elevation, the blood retina barrier disruption occurs. Pathological changes at this stage (exudative phase) include necrosis of smooth muscle and endothelial cells, exudation of blood and lipid and microaneurysm, retinal haemorrhage, hard exudates, cotton wool spots seen in retina [6]. Very severe hypertension (malignant hypertensive phase) may lead to optic disc swelling.

Regular fundus examination in all cases of PIH results in a proper assessment of the clinical status of the patient. It is a helpful diagnostic tool for prediction of severity and thereby improving the feto-maternal outcome by managing the pregnancy judiciously and providing timely termination. [12]

MATERIALS AND METHODOLOGY

This was an observational prospective study of 177 patients (354 eyes) who were diagnosed with pregnancy induced hypertension. Patients were excluded if they had co-existing diabetes mellitus, patients with underlying ocular co-morbidity like Glaucoma, past history of ocular trauma, ocular surgery or previous laser treatment and also conditions in which retinal details not seen (e.g., cataract, corneal opacities).

Clinical evaluation was done in antenatal period (between 20 weeks of gestation till pregnancy) and once at one to six weeks of post-partum period.

Patient's age, number of pregnancies, gestation period in weeks, blood pressure and proteinuria were noted from their clinical records.

The pupils were dilated with Tropicamide 1% eye drops. A complete ocular history and detailed examination that included presenting visual acuity, anterior segment examination by slit lamp biomicroscopy, intra-ocular pressure measurement by noncontact tonometer, posterior segment examination with both direct and indirect ophthalmoscopy was done.

Fundus findings were noted in detail, Fundus changes were graded according to modified Keith, Wagner and Barker classification.

The dipstick method was used to test proteinuria . The severity of PIH was classified as pre-eclampsia and eclampsia. The ethical clearance for the study was obtained from the Intuitional Ethics Committee-Human Research before commencement of the study. All the patients were informed about the study and their consent was taken.

DATA ANALYSIS

Data master sheets were used to process and analyse collected data by using tables and figures using the Microsoft Excel 2013 software. The statistical software used was SPSS (Statistical Package for the Social Sciences) Ver.16. Demographic variables were presented using descriptive statistics like ratios, proportions and percentages. To compare association between two attributes (e.g., association between fundus findings and blood pressure or proteinuria) for sufficiently large sample size Chi-square test was used. To assess difference between two related observations (e.g., to compare change in fundus status antenatal and post-partum visits) we used Mc Nemar-Bowker Test. A P value < 0.05 was taken as significant.

RESULTS

The mean age of patients was 27.26 years (range 18-35 years). The gestation period ranged from 25 weeks to 35 weeks; 34 (43.5%) were primigravida and 107(60.45%) were multiparity.81(46%) patients had mild preeclampsia, 70(39.8%) patients had severe preeclampsia and none had eclampsia.

Visual symptoms are less in patients with PIH. 13(7.34%) patients complained of transient loss of vision ranging from 3 minutes-10minutes.164 patients had no visual complaints. Of these patients with visual complaints, 20(11.4%) were associated with headaches.

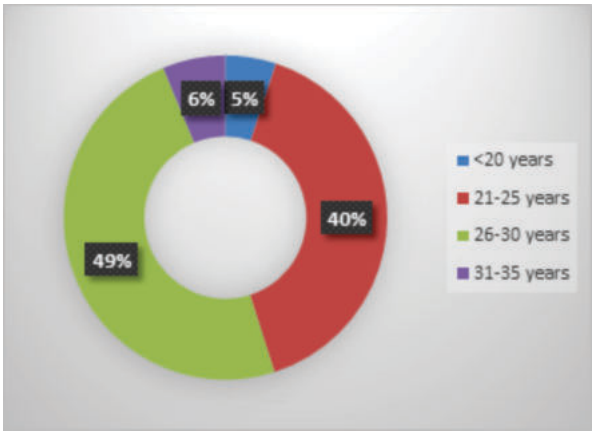
Retinal changes (hypertensive retinopathy) were noted in 55 (30.5%) patients, among those 24(13.6%) patients had grade I retinopathy;12(6.8% patients had grade II retinopathy;15(8.5%) patients had grade III retinopathy and none had grade IV retinopathy.

Retinal lesions found in our study were hard exudates in 19(10.8%) patients, cotton wool spots in 14(18%), retinal haemorrhages in 8(4%), mild blood vessel narrowing in 53(30.1%), AV crossing sign in 44(24.4%), copper wire appearance of blood vessel in 12(6.2%) and disc pallor in 35(19.9%) of PIH cases.

Hypertensive retinopathy was found in 55(31.07%) patients during pregnancy which reduced to 28(15.3%) patients after delivery (post 1 week of duration).

There was statistically significant positive association of retinal changes and systolic blood pressure (P =o.oo3) and proteinuria (P =0.0005).

Diagram 1- Distribution of patients as per age groups



Pie chart depicts maximum number of cases (49%) were from 26-30 years of age group and followed by 40% cases in 21 to 15 years of age group

Table 1- Distribution of patients as per gravida status

Gravida (G)status	Frequency	Percent (%)	Cases with positive fundus findings	Percent (%)
Primi	69	39.2	7	12.72
G-1	45	25.0	9	16.36
G-2	38	21.6	15	27.27
> G3	25	14.2	24	43.63
Total	177	100.0	55	100.0

The incidence of positive fundus findings is most common in third gravida (43.63%) and second gravida (27.27%), than primigravida (12.72%).

Diagram 2- Correlation of fundus findings in PIH with Systolic blood pressure With increase in systolic blood pressure >155mmHg the incidence of positive fundus findings have increased.

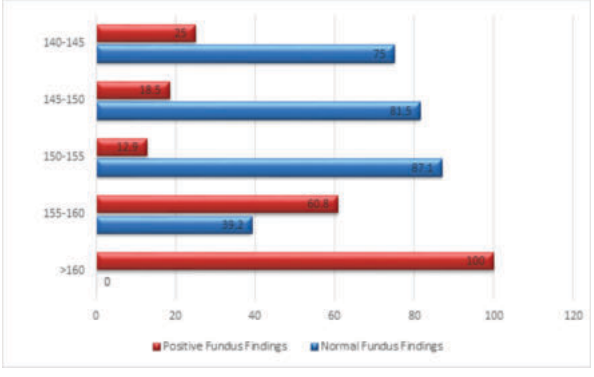
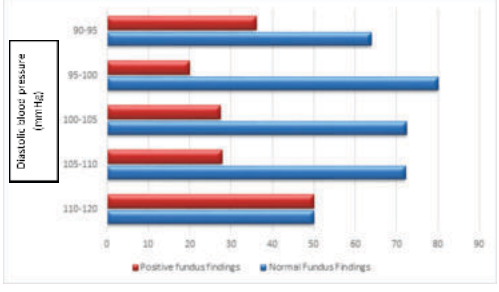


Diagram 3- Correlation of fundus findings in PIH with Diastolic blood pressure



The incidence of fundus changes did not increase with increase of diastolic blood pressure as seen with systolic blood pressure.

Table 2-Distribution of patients as per presentation of symptoms (headache)

Symptoms	Frequency	Percent	Positive Fundus Findings	Percentage
Absent	157	88.6	41	74.54
Present	20	11.4	14	25.54
Total	177	100.0	55	100.0

Among 11.4% of PIH cases with headache as symptoms only 14 (25.54%) patients had positive fundus findings.

Table 3-Distribution of patients as per presentation of signs

Pedal oedema	Frequency	Percent	Positive Fundus findings	Percentage
Absent	98	55.1	16	29.09
Present	79	44.9	39	70.90
Total	177	100.0	55	100.0

Table 4-Distribution of visual acuity in all types of hypertensive disorders in pregnancy

Best corrected Visual acuity (BCVA)	Frequency	Percent (%)	Cases with positive fundus findings	Percent (%)
6/6	118	67.0	19	34.54
6/9	46	26.1	33	60.1
6/12	12	6.2	3	5.45
6/18	1	0.6	0	0
Total	177	100.0	55	100.0

no significant visual symptoms in PIH cases with hypertensive retinopathy

Diagram 4-The correlation between fundus findings and albuminuria in PIH cases

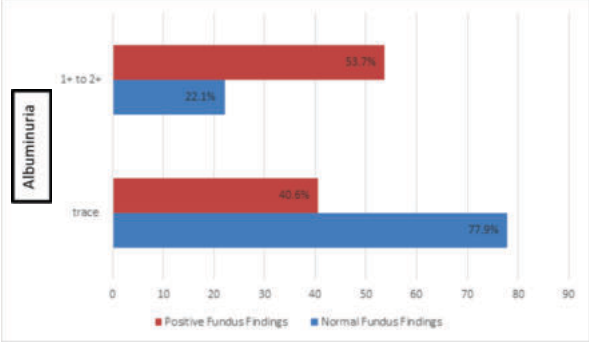
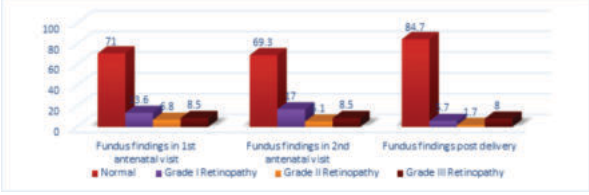
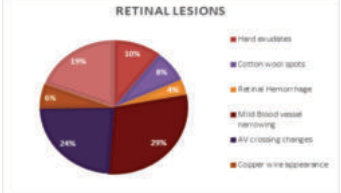


Diagram 5 - Distribution of grades of retinopathy changes during antenatal and postnatal assessment in PIH cases.



We observed decreased and non-progression in grade of hypertensive retinopathy as appropriate treatment was initiated for PIH. The above graph shows increase in normal fundus from71% in antennal visit to 84.7% in post-partum visit along with decrease in grade I retinopathy and grade II retinopathy from 13.6% to 5.7% and 5.8% to 1.7%in antenatal and postpartum visit respectively.

Diagram 6- Frequency of Retinal lesions in PIH cases



Vascular changes were noted in majority of cases with hypertensive retinopathy in PIH. Mild blood vessel narrowing (30.1%) being most common followed by AV crossing changes (24.4%). Other than vascular changes; optic disc showed pallor in 19.9% of cases

DISCUSSION

In the present study, hypertensive retinopathy changes were seen in 55 (30.1%) patients with pregnancy induced hypertension. Resolution of Hypertensive retinopathy was seen in 28 (15.3%) patients in postpartum period (1 week after delivery).

Since the antenatal check-up of pregnant ladies is done regularly, hypertension was detected early during the antenatal visits and treatment was started immediately. This could be the probable reason for the presence of only grade I to grade III hypertensive retinopathy changes in our study.

The prevalence of hypertensive retinopathy changes 30.5% seen in our study is higher than 24.07% [10], 21.5% [4], 27.27% [5], but lesser than 38.36% [12] and 59% [21].

In our study, none of the patients developed multiple haemorrhages, papilledema or retinal detachment. This can be attributed to proper antenatal care and early detection of PIH cases, thereby preventing them to progress to Grade 3 hypertensive retinopathy.

Of 124 patients who had <160 mmHg systolic and <100 mmHg diastolic blood pressure, 20(11.29%) patients had developed hypertensive retinopathy changes while out of 53 patients who had >160 mmHg systolic and/or >100 mmHg diastolic blood pressure, 32 (18.05%) patients developed hypertensive retinopathy changes.

There was significant 34.412 (P = 0.003) association between retinopathy changes and systolic blood pressure readings in the present study which is similar to that reported by Tadin et al. [57] Reddy et al. [6]

In our study, 56 patients had proteinuria of +1 to +2 on the dipstick. Of 56 patients, 29 (51.8%) patients developed retinopathy compared to 25 (20.43%) patients from 121 who did not have proteinuria. Proteinuria was significantly (P = 0.0005) associated with retinopathy which is similar to that reported by Reddy et al., [7] Karki et al. [8].

The retinal changes were seen more in patients with severe hypertension (SBP), severe proteinuria and severity of the disease in present study; they were significantly associated with these factors. A similar association between hypertensive retinopathy and the above three parameters was reported in earlier studies [5]-[10]. We did not find any case of serous retinal detachment in present study which is similar to the previously reported studies [23]-[22]. However, Rasdi et al [6] reported a case of serous retinal detachment from Malaysia.

The presence of changes in the retinal arterioles and retinal haemorrhages may indicate similar changes in the placenta. Since the foetus well-being depends on the placental circulation, ophthalmoscopic examination of mother's fundus may give a clue to similar micro-circulation changes in the placenta and indirectly to the foetal wellbeing [22]. Fundus examination in patients with PIH is an important clinical evaluation to predict adverse foetal outcomes [22].

This study found visual symptoms are few in patients with PIH and often absent unless the macula is involved. Sudden onset of headache, which is resistant to routine therapy in these patients, may be the warning symptom before the onset of first convulsion [21]. The presence of multiple hard exudates in retina may indicate possibility of damage to the kidneys. The presence of papilledema in the eyes may indicate raised intracranial tension and such patients may develop convulsions. Therefore, by repeated fundus examinations at regular intervals one can assess the severity of the disease and response to treatment instituted.

CONCLUSION

We conclude that, majority of patients in this study with hypertensive disorders in pregnancy had good visual acuity during antenatal and postnatal period. Thirty-point five percent (30.5%) of pregnant mothers with hypertensive disorders had related hypertensive retinopathy. The retinal changes due to PIH are significantly correlated with the severity of the disease and level of systolic blood pressure and proteinuria. Routine ophthalmoscopic examination of PIH cases for an assessment of the vascular changes in fundus is a helpful diagnostic tool for prediction of severity and thereby improving the feto-maternal outcome by managing the pregnancy judiciously and providing timely termination.

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