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Original Research Article

A study on ocular fundus changes in women with hypertensive disorders of pregnancy in a tertiary care hospital

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ABSTRACT

Purpose: The study was conducted to find ocular fundus changes in women with hypertensive disorders of pregnancy, and to study the correlation of ocular fundus changes with severity for hypertension, age, parity of women.

Materials and Methods: A prospective observational study was conducted in a tertiary eye care hospital at Hyderabad, Telangana from 12/10/2020 to 14/07/2021, among a total of 150 patients with hypertension in pregnancy at a tertiary care hospital. A detailed history was taken, ocular examination and fundus examination is done.

Results: A total of 150 patients were examined. Fundus changes are seen in 31 patients. The mean age of patients is 25.48 years. Patients with Retinal changes seen in 20.66%. Patients grade – 1 hypertensive retinopathy seen in 13.53, grade – 2 hypertensive retinopathy seen in 5.33%, grade – 3 hypertensive retinopathy seen in 0.66%, grade – 4 hypertensive retinopathy seen in 1.33%. In the present study there is a significant correlation between parity of pregnancy and retinal changes with p=0.0000005 and correlation with severity of Hypertension and fundus changes is significant with P =0.0000001.the correlation of age with retinopathy is not significant with p=0.16.

Conclusion: Ocular fundus changes has its importance in the course of pregnancy with hypertension as severity of hypertension if increases there can be changes in retina which indicate a harm to the baby and mother and it will be helpful in termination pregnancy. Pregnant women with hypertension are advised to go for screening of eyes and also regular checkups.

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1. Introduction

Hypertension in pregnancy is a multisystem disorder which includes changes in CNS, CVS; hepatic, renal, hematological, neurologic, ocular systems.[1] Hypertension is most commonly encountered during gestation period. It can complicate in 8 to 10% of all pregnancies. It is the important cause of maternal, prenatal morbidity and mortality.[2] In eye, severe toxemia is the main cause of diminution of vision. Retinal vessels may take days to develop constriction and last for weeks to months. Progression of retinal changes are similar to ischemic changes in placenta, decides the maternal outcome and fetal mortality rate.[1]

2. Materials and Methods

This is a prospective observational study was performed in the department of ophthalmology, of Osmania medical college, Hyderabad, Telangana, from 12/10/2020 to

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14/07/2021. The study included 150 patients who come for check-up in out-patient department and patients admitted in maternity hospital. Pregnant woman diagnosed with hypertension in the age group of 18 to 35 years of age and patients who come under ACOG guidelines criteria for hypertensive disorders of pregnancy were included in the study. People with hazy media which hinders the ocular fundus examination were excluded from the study. Written and informed consent was obtained from all the patients before eye examination. Institutional ethics committee approval also obtained for the study.

Patients were asked the basic information, chief ocular complaints are noted. A brief history of hypertension in pregnancy, duration, present treatment was noted. For all patients ocular examination is done

Pupils dilated with tropicamide (0.5%) eye drops and detailed fundus examination is done with help of direct ophthalmoscope /indirect ophthalmoscope. The data was arranged on a excel spreadsheet, continuous parametric data was reported and relevant statistical analysis was done. In case of correlation p value of <0.05 was assigned as statistically significant. In case of hypertensive retinopathy, the changes are noted based on keithwagner barker classification.

3. Results

In the present study, out of 150 patients examined. Fundus changes are seen in 31 patients. The mean age of patients is 25.48. In the present study grade 1 hypertensive retinopathy seen in 13.53%, grade 2 hypertensive retinopathy seen in 5.33% grade 3 hypertensive retinopathy in 0.66%, grade 4 hypertensive retinopathy in 1.33%. In this study, patients with chronic hypertension had fundus changes in 16.66% patients with gestational hypertension had 3.8% of cases and with, mild preeclampsia has 16% of cases and with severe pre-eclampsia has 43% of cases and patients with eclampsia has shown all of cases with positive fundus findings. There is increase in fundus changes in patients, as the severity of hypertension increases with p=<0.0000001. Pregnant women with Primi Gravidae has the Highest Number of Patients with Hypertensive retinopathy present (n=19), Pregnant women with multi Gravidae has the Lowest number of Patients affected with Hypertensive retinopathy changes (n=10) and has a p value of 0.0000005. Women with age of 20 to 24 years has the Highest Number of Patients with retinopathy changes (n=16), Pregnant women with age of 30 and above has the Lowest Number of Patients with retinopathy changes (n=5) and has a p value of 0.16.

4. Discussion

Hypertension in pregnancy is diagnosed as that usually occurs in the absence of any other cause with elevated blood pressure of >140/90 mmhg or a rise of 30mmhg of systolic pressure or 15mmhg of diastolic pressure, taken on two occasions after rest of 4 hours.[3] Risk factors for hypertension in pregnancy are modifiable: body mass index, anemia, lower education. Non modifiable: preexisting hypertension and diabetes, multipara and primipara, family history of hypertension, history of hypertension in previous pregnancies.[2] Genetic mutations in single nucleotide polymorphism in angiotensinogen gene is also a non-modifiable risk factor.[2]**Gestational hypertension**: is defined as a systolic blood pressure 140 mm Hg or more or a diastolic blood pressure of 90 mm

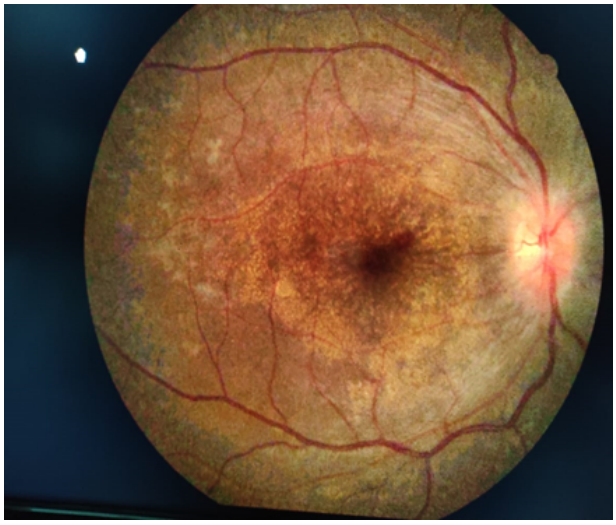

Fig. 1: Fundus picture of right eye showing Grade 4 hypertensive retinopathy changes with Disc edema and exudates around the macula with attenuation of arterioles, tortousity of veins

Fig. 2: Fundus picture of left eye showing Grade 4 hypertensive retinopathy changes with Disc edema and exudates around the macula with attenuation of arterioles, tortousity of veins

Table 1:

S. No	Study sample of 150 patients		Number of patients	Percentage
1	Age distribution	20-24 years	69	46
		25-29 years	67	44.66
		30 and above	14	9.33
2	Parity	Primi gravida	82	54.66
		Muti gravida (G2,G3)	53	35.33
		Grand multi gravida	15	10
3	Gestational age distribution	23-26 weeks	27	18
		27-30 weeks	79	52.66
		30 and above weeks	44	29.33
4	Symptoms	Diminution of vision	3	2
		Headache	4	2.66
		Headache And Blurring of Vision	2	1.33
		No Symptoms	141	94
5	Right eye	6/12	1	0.66
		6/6	112	74.66
		6/60	2	1.33
		6/9	35	23.33
6	Left Eye	6/12	3	2
		6/6	112	74.66
		6/60	2	1.33
		6/9	33	22
7	Diagnosis	Chronic Hypertension	30	20
		Eclampsia	4	2.66
		Gestational Hypertension	54	36
		Mild Preeclampsia	24	16
		Severe Preeclampsia	37	24.66
11	Fundus Findings (Both Eyes)	Normal Fundus	119	79.33
		Grade1 HTN retinopathy	20	13.33
		Grade 2 HTN retinopathy	8	5.33
		Grade 3 HTN retinopathy	1	0.66
		Grade 4 HTN retinopathy	2	1.33

Table 2: Correlation of age and parity with retinopathy

S.No	Parity	Retinopathy present	Absent	Total	P value
1	Primi	19	63	82	
2	Multi (G2,G3)	2	51	53	0.0000005
3	Grand multi	10	5	15	
	Age group	Retinopathy present	Absent	Total	P value
1	20-24 years	16	53	69	
2	25-29 years	10	57	67	0.16
3	30 and above years	5	9	14	

Table 3: Correlation of severity of hypertension with retinopathy

S. No	Diagnosis	Fundus examination					Total	P value
		Normal	Grade I	Grade II	Grade III	Grade IV		
1	Chronic HTN	25	4	1	0	0	30	P=<0.0000001
2	Gestational HTN	52	2	0	0	0	54	
3	Mild Pre eclampsia	21	4	0	0	0	25	
4	Severe Pre eclampsia	21	9	6	0	1	37	
5	Eclampsia	0	1	1	1	1	4	

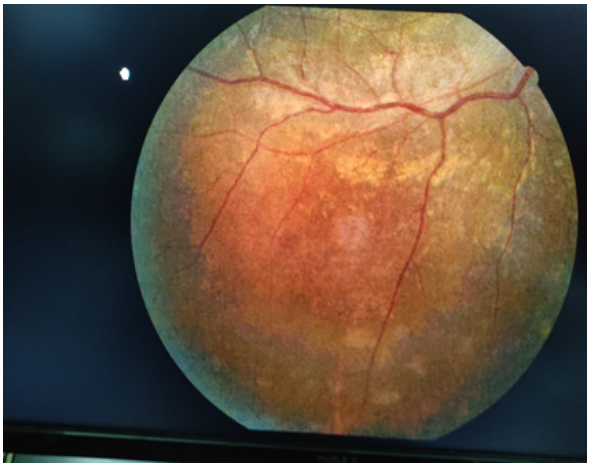

Fig. 3: Fundus picture of right eye showing inferior temporal quadrant with a-v nicking with arteriolar narrowing

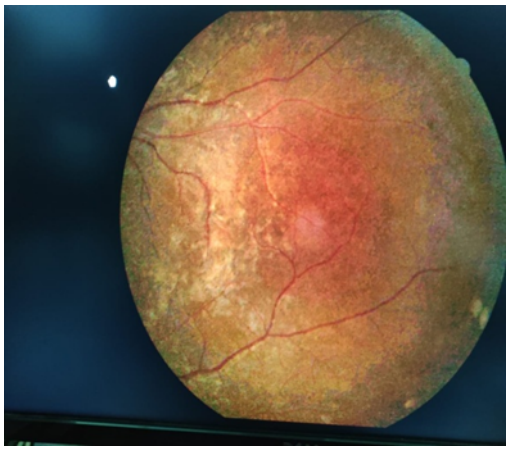

Fig. 4: Fundus picture of right eye showing nasally elschnig spots and cotton wool spots

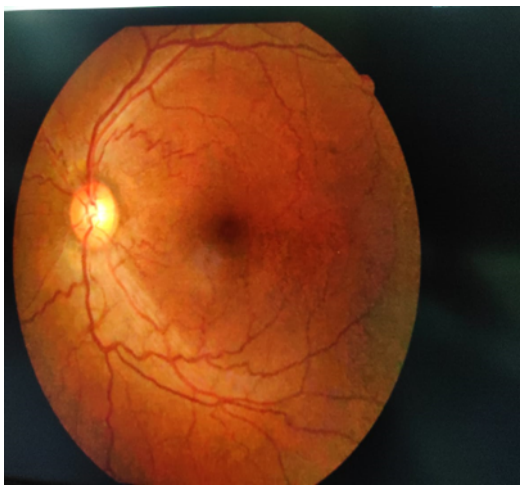

Fig. 5: Fundus picture of left eye showing Grade 2 hypertensive retinopathy changes with arteriolar narrowing and AV nicking in supero temporal and infero temporal arcades

Fig. 6: Fundus picture of right eye showing Grade 2 hypertensive retinopathy changes with ateriolar narrowing and AV nicking in supero temporal and infero temporal arcades

Hg or more, or both, on two occasions at least 4 hours apart after 20 weeks of gestation, in a woman with a previously normal blood pressure.[4] **Pre-eclampsia**: after 20 weeks of gestation, SBP > OR = to 140mmhg or DBP >or= to 90mmhg in a previously normotensive woman with proteinuria (excretion of >0.3g protein in a 24-hour urine collection) without other systemic manifestations. **Chronic hypertension**: SBP > or = 140mmhg and/or DBP >or= 90mmhg before pregnancy or before 20 weeks of gestation.[5]

ECLAMPSIA is defined by new-onset tonic-clonic, focal or multifocal seizures in the absence of other causative conditions such as epilepsy, cerebral arterial ischemia and infarction, intracranial haemorrhage, or drug use.[6] Some of these alternative diagnoses may be more likely in cases in which new-onset seizures occur after 48–72 hours postpartum or when seizures occur during administration of magnesium sulfate.[6]

The following are classification system for hypertensive retinopathy based on fundus examination with indirect ophthalmoscopy or +90 D lens. The present study is based on the Keith-Wagner- Barker classification Grade 1: Slight constriction of retinal arterioles. Grade 2: Grade 1 (+) focal narrowing of retinal arterioles (+) AV nicking. Grade 3: Grade 2 (+) flame-shaped haemorrhages (+) cotton-wool spots (+) hard exudates. Grade 4: Grade 3 (+) optic disc swelling.[7] The manifestations of hypertensive choroidopathy include serous retinal detachment, Elschnig spots, and Siegrist streaks. Elschnig spots are yellow demarcated lesions in the perimacular region that leak fluorescein after occlusion of the choriocapillaris. When the Elschnig spot heals, a pigment spot is left surrounded by a depigmented pale halo. Siegrist streaks are linear hyperpigment-ed streaks over the choroidal arteries.[8]

In the present study, out of 150 patients examined. Fundus changes are seen in 31 patients. In the present study, patients who had retinal changes during pregnancy were called in the post pregnancy period for follow up and majority of the patients had shown resolving fundus changes. Patients with retinal changes seen in 20.66%, which is similar to a study conducted by N Rama Bharathi et al[9] (23.33%). And also to the study conducted by HC Savitha et al[10] (17%). In the present study, grade 1 hypertensive retinopathy was seen in 13.53%, which is similar to a study conducted by Kumarra Nandha V et al[11] (13%), Grade 2 hypertensive retinopathy was seen in 5.33% which is similar to study conducted by Varija T et al[12] (4.3%) and R Sudha et al[13]. (6.15%). Grade 3 hypertensive retinopathy seen in 0.66%. Grade 4 hypertensive retinopathy seen in 1.33% cases which is similar to Kumarra Nandha V et al[11] (2%).

In our present study no changes of retinal detachment or macular Oedema or vascular occlusions are seen. In the present study, patients with normal fundus findings are 79.33%. There is a significant correlation between parity of pregnancy and fundus changes with p=0.0000005, where as in study conducted by Akanksha et al[14] the p=0.01 In the present study, the correlation of age with retinopathy is not significant with a p value = 0.16 the correlation with the severity of hypertension and fundus changes is significant with p<0.0000001. Where as in study conducted by Akanksha et al,[14] the p=0.009. In the present study, people with retinal changes, had blurring of vision and headache with some patients as the main complaints. In this study, patients with chronic hypertension had fundus changes in 16.66% patients with gestational hypertension had 3.8% of cases and with, mild preeclampsia has 16% of cases and with severe pre-eclampsia has 43% of cases and patients with eclampsia has shown all of the cases with positive fundus findings. Patients with eclampsia had blurring of vision and headache, which resolved in post pregnancy follow ups.

When comes to age, retinopathy changes are more seen in younger ages of 20-24 years. When comes to severity of hypertension, as increases there is a significant increase in the fundus changes in patients, as the correlation is significant with a p value of 0.0000001. In our study, 23year female with primi gravid with 30 weeks of gestation, has severe pre eclampsia shown the findings in image a)and b) right and left eyes fundus photo showing grade 4 hypertensive retinopathy changes with optic disc edema and exudates around macula, her vision in both eyes were 6/60 in the peripheral fundus she has elschnig spots and cotton wool spots at few areas in image c) d). She was advised strict control of blood pressure. In the next image e) f) left and right eyes showing 26y/f with 28 weeks of gestation has vision of 6/6 in both eyes, shows grade 2 hypertensive retinopathy in both eyes with arteriolar narrowing and a-v nicking at few places, patient was advised for regular follow-ups for monitoring hypertension.

5. Conclusion

Ocular fundus changes has its importance in the course of pregnancy with hypertension as severity of hypertension if increases, there can be changes in retina which indicate a harm to the baby and mother and it will be helpful in termination of pregnancy. In most of the pregnant women, with hypertension, they are left undiagnosed even they had retinal changes, which can lead to complications and vision loss. So Pregnant women with hypertension are advised to go for screening of eyes and also regular checkups should be done in patients diagnosed with significant retina changes and also in severe hypertension in order to save the mother and the baby.

6. Source of Funding

None.

7. Conflict of Interest

None

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