



## RETINAL VASCULAR CHANGES IN PREGNANCY INDUCED HYPERTENSION

## Ophthalmology

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## ABSTRACT

**Aim:** 1.To study retinal vascular changes in pregnancy induced hypertension. **Materials & Methods:** This Hospital based cross sectional study was conducted on 50 patients attending a tertiary care hospital with a diagnosis of PIH. Fundus examination was done with a direct ophthalmoscope and the findings were noted and analyzed. **Results:** A total of 50 patients of PIH were examined. The mean age of patients was 30 ( 18 to 45) years. The gestation period ranged from 20 weeks to 42 weeks. 36(72%) were the primi gravida and 14 (28%) were multi gravida . 42 (84%) Patients had pre-eclampsia and 8 (16%) had eclampsia. Retinal changes (hypertensive retinopathy) were noted in 35(70%) patients- Grade 1 in 16 (45.71%) patients, Grade 2 in 13 (37.14%) , Grade 3 in 4 (11.43%) and Grade 4 in 2 (5.71%). There was statistically significant positive association of retinal changes and severity of hypertension ( $p=0$ ). **Conclusions:** Hypertensive retinopathy changes were seen in 35(70%) of PIH patients. Occurrence of PIH cases can be decreased with better antenatal care and early detection and treatment of PIH cases. There is greater chance of developing retinopathy with increase of blood pressure and severity of PIH.

## KEYWORDS

Pregnancy Induced Hypertension (PIH), pre-eclampsia, eclampsia, retinal vascular changes.

## INTRODUCTION

Pregnancy induced hypertension (PIH) is hypertension that occurs after 20 weeks of gestation in women with previously normal blood pressure. The broad classification of pregnancy-induced hypertension during pregnancy is gestational hypertension, pre-eclampsia and eclampsia (1). Retinal changes are liable to occur when the systolic pressure raises above 160 and the diastolic above 100 mm Hg and are marked when these limits reach 200/130 mm of Hg (2, 3). Pregnancy-induced hypertension results in vision-threatening illnesses like central retinal artery occlusion, central serous retinopathy, secondary optic atrophy, retinal detachment, macular tear, choroidal ischemia, central retinal vein occlusion, and haemorrhage.

Ocular involvement is common in PIH occurring in as many as 30-100% of patients.(4) Common symptoms are blurring of vision, photopsia, scotomas and diplopia. Visual symptoms may be the precursor of seizures. (5) Progression of retinal changes correlates with progression of PIH(6) and also with the fetal mortality due to similar vascular ischemic changes in the placenta.

## MATERIALS &amp; METHODS

The present study was conducted in a Tertiary care Hospital for a period of 1 year from 1<sup>st</sup> April 2021 to 31<sup>st</sup> March 2022 on the patients who were diagnosed as cases of Pregnancy Induced Hypertension (PIH). Ethical clearance was taken from the Institutional Ethics Committee before carrying out the study. The nature of study was explained to the patients and / or attendants for their cooperation & their informed consent was taken. 50 PIH patients were included in this study.

## Inclusion Criteria

1. Patients diagnosed with pregnancy induced hypertension in the age group of 18-45 years.
2. patients with >20 weeks of gestation.

## Exclusion Criteria

1. Patients with preexisting hypertension
2. Patients having ocular pathologies like glaucoma, cataract, corneal opacities, having hazy media.
3. patients with CVS disease, renal pathology.

Detailed ophthalmic examinations was carried out in diagnosed PIH cases that include visual acuity measurements by snellen chart, Anterior segment examination by slit lamp microscope first and then the fundoscopic examinations was carried out with direct & indirect ophthalmoscope after dilating the pupil with mydriatics ( 0.5% Tropicamide) in the selected cases after taking informed & written

consent in each patients & then repeated after 6 & 10 weeks of delivery for signs of reversal of retinopathy.

Grading of hypertensive retinopathy was done as per ( SCHEIE" S) Classification-

STAGE 0: No changes

STAGE I: Slight arteriolar narrowing.

STAGE II: Marked narrowing with focal constrictions

STAGE III: Stage 2 with haemorrhages, cotton wool spots and exudates.

STAGE 4: stage 3 disc oedema

## RESULTS &amp; OBSERVATION

**Table 1 : Showing The Agewise Incidence Of Pih**

| Age groups in years | No. Of cases | Percentage |
|---------------------|--------------|------------|
| <20                 | 8            | 16         |
| 21-30               | 21           | 42         |
| 31-40               | 19           | 38         |
| >40                 | 2            | 4          |
| Total               | 50           | 100        |

In the present series, the patients were from 18 to 45 years of age and most cases having PIH were between 21 to 40 years of age. Total cases taken for case study is 50.

**Table 2. Incidence Of Pih In Relation To Parity**

| GRAVIDA      | Number of cases (N) | PERCENTAGE % |
|--------------|---------------------|--------------|
| Primigravida | 36                  | 72           |
| Multigravida | 14                  | 28           |
| Total        | 50                  | 100          |

Out of the total 50 cases studied, 36 cases (72%) of PIH were found in primigravida and rest 14 no. of cases (28%) of PIH were multigravida.

**Table 3. Showing The Clinical Groupings Of The Cases Of Pih.**

| Grading                         | Number of cases (N) | Percentage (%) |
|---------------------------------|---------------------|----------------|
| Grade 1-Mild pre-eclampsia      | 18                  | 36             |
| Grade 2- severe pre - eclampsia | 24                  | 48             |
| Grade 3- Eclampsia              | 8                   | 16             |
| Total                           | 50                  | 100            |

It is observed from the above table 3, that 42 (84%) Patients had pre-eclampsia and 8 (16%) had eclampsia

**Table 4. Showing The Fundus Findings In Pih**

| Fundus findings | Number of cases(N) | Percentage (%) |
|-----------------|--------------------|----------------|
| Normal          | 10                 | 20             |
| Abnormal        | 40                 | 80             |
| Total           | 50                 | 100            |

Out of the 50 cases of PIH patients studied, 10 patients had normal fundus findings and the rest 40 patients had some abnormal findings in their fundus.

**Table 5- Retinal Signs Distribution According To Severity Of Preeclampsia And Eclampsia.**

| Retinal signs                    | Mild PE | Severe PE | Eclampsia | Total |
|----------------------------------|---------|-----------|-----------|-------|
| Focal arteriolar narrowing       | 8       | 20        | 4         | 32    |
| Generalised arteriolar narrowing | 0       | 10        | 3         | 13    |
| Cotton wool spots                | 0       | 6         | 3         | 9     |
| Haemorrhages                     | 0       | 5         | 3         | 8     |
| Hard exudates                    | 0       | 4         | 2         | 6     |
| papilloedma                      | 0       | 1         | 2         | 3     |
| Retinal detachment               | 0       | 0         | 0         | 0     |
| Macular oedema                   | 0       | 1         | 1         | 2     |
| Ischemic optic neuropathy        | 0       | 0         | 0         | 0     |

Table 5 shows that 32 cases showed focal arteriolar attenuation and it was a common retinal sign & was most commonly seen in severe pre-eclampsia & other above mentioned signs were seen in severe pre-eclampsia and eclampsia.

There is significant association between changes of ocular fundus & severity of pre-eclampsia & eclampsia ( $p < 0.5$ )

**Table 6- Correlating Fundus Findings With Severity Of Hypertension.**

| FUNDUS FINDINGS            | TYPE OF PIH |       |            |       |           |      |       |     |
|----------------------------|-------------|-------|------------|-------|-----------|------|-------|-----|
|                            | MILD HTN    |       | SEVERE HTN |       | ECLAMPSIA |      | TOTAL |     |
|                            | N           | %     | N          | %     | N         | %    | N     | %   |
| NORMAL                     | 6           | 33.33 | 4          | 16.66 | 0         | 0    | 10    | 20  |
| GRADE 1 HTN RETINOPATHY    | 2           | 11.11 | 10         | 41.66 | 4         | 50   | 16    | 32  |
| GRADE 2 HTN RETINOPATHY    | 10          | 55.55 | 3          | 12.5  | 0         | 0    | 13    | 26  |
| GRADE 3 HTN RETINOPATHY    | 0           | 0     | 4          | 16.66 | 0         | 0    | 4     | 8   |
| GRADE 4 HTN RETINOPATHY    | 0           | 0     | 0          | 0     | 2         | 25   | 2     | 4   |
| CENTRAL SEROUS RETINOPATHY | 0           | 0     | 2          | 8.33  | 1         | 12.5 | 3     | 6   |
| MACULAR EDEMA              | 0           | 0     | 1          | 4.16  | 1         | 12.5 | 2     | 4   |
| TOTAL                      | 18          | 100   | 24         | 100   | 8         | 100  | 50    | 100 |

Here, N= Number of cases & %= percentage.

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P- VALUE=0 \*study is significant.

Fundus changes found in all the 50 patients was co-related with the severity of HTN and p- value= 0, showing that the two variables have a strong association. That means as the severity of hypertension increases, there is more chance of the patients having abnormal fundus findings.

## DISCUSSION

### 1. Age Distribution In Present Study With That Of Other Study

Age distribution in PIH patients noted in our study is more or less

similar to that of study by sudhir babu (7) who conducted his study in 100 PIH Patients, who were referred to the department of ophthalmology Kamineni Institute of Medical Sciences, KARNATAKA in the year 2015 to 2016.

Our present study is similar to that of study by Ravikant patel (8) in 64 PIH patient in the department of O & G, GMERS Medical College & Hospital, Gujarat in the year 2017.

In both the comparison studies, it is noted that maximum number of PIH patients belong to younger age groups.

## 2. GRAVIDA

In our study of 50 cases, 36 cases (72%) were primi-gravidas and 14 cases (28%) were multi-gravidas. Though PIH found more in primi-gravidas, there was no correlation between the parity and fundus findings observed.

In *S.C. Reddy et al.* (9) study 34 (43.6%) were primi-gravida, 27 (34.6%) were multi-gravidas and 17 (21.8%) were grand multi-gravidas. Thus, PIH changes in fundus occur in primi-gravidas more commonly and it decreases as gravida increases..

## 3. Gradients Of Pih.

In our study, 18 cases (36%) had mild pre-eclampsia, 24 cases (48%) had severe pre-eclampsia and 8 cases (16%) had eclampsia.

In study by *S.C.Reddy et al* (9), 38.4% had mild pre-eclampsia, 59% had severe pre-eclampsia and 2.5% had eclampsia.

In another study by Tadin et al (10) study the percentage of cases are more or less similar to our present study. Thus, more cases were seen in mild and severe pre-eclampsia and only few cases if not treated goes into eclampsia.

## 4.RETINAL CHANGES IN PIH

In a study conducted by Duke Elder, the most common retinal changes is attenuation of retinal arterioles, occurring in approx. 60 % of patients with pre-eclampsia (11). In our study 32 cases showed focal arteriolar attenuation and it was a common retinal sign and it was most commonly seen in severe pre-eclampsia. In our study there was no case of retinal detachment.

Fry et al (12) reported retinal detachment in 1.20% cases. Bosco et al (13) reported bilateral retinal detachment in 7 cases. The presence of retinal haemorrhage, macular edema, papilledema and retinal detachment are the indications of termination of pregnancy to save mother and child. (14)

## 5. Grades Of Hypertensive Retinopathy

In a study done on 275 cases of pre-eclampsia and 125 cases of eclampsia by Reddy from India, he reported retinal changes in 53.4%. In the present study, 45.71 % had grade 1 hypertensive retinopathy changes, 37.14% had grade 2 hypertensive retinopathy changes, 11.43 % had grade 3 & 5.71% had grade 4 hypertensive retinopathy. There were no cases of exudative retinal detachment.

## CONCLUSION

The present study shows that routine ophthalmoscopic examination is an important & essential guide in the diagnosis, prognosis & management of the patients with PIH. Focal spasms or generalized arteriolar attenuation were the most common vascular findings. Grade III and Grade IV retinopathy changes were more frequently noted in patients with severe pre-eclampsia and eclampsia. PIH is associated with various retinal changes & these are directly proportional to severity of PIH & retinopathy are reversible in post partum period.

**Conflict of Interest:** None

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