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Original Research Article

A Prospective Observational Assessment of Retinal Changes among Patients Presenting with Pregnancy Induced Hypertension

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Abstract

Aim: The aim of the present study was to assess the retinal changes among patients presenting with pregnancy induced hypertension.

Methods: This was a prospective observational study carried out in the Department of Ophthalmology, IGIMS, Patna, Bihar, India. 100 patients who fulfilled diagnostic criteria of PIH during a period of one year were enrolled for the study. Informed consent was taken and baseline data was recorded.

Results: Most of the women belonged to 20-30 years of age group. 64 (64%) were primigravida, 26 (26%) were multigravida (2-4 pregnancies), and 10 (10%) were Grand Multi (5 or more deliveries). 36 (36%) patients had mild preeclampsia, 52 (52%) had moderate to severe preeclampsia and 12 (12%) had Eclampsia. Among primigravida patients 34 patients showed fundus changes while out of 26 patients who were multigravida 22 patients had retinal changes. We found a significant correlation between gravidity and retinal changes ($p = 0.01$). In our study, retinal changes were observed in 11 patients out of 36 patients with non severe preeclampsia, 11 out of 12 patients with severe preeclampsia and all eclampsia patients showed fundus changes. 22 patients had grade I changes, 32 showed grade II changes, grade III and grade IV hypertensive changes was seen in 8 and 3 patients respectively. Six patients developed serous retinal detachment.

Conclusion: Grade III and Grade IV retinopathy changes were more frequently noted in patients with severe preeclampsia and eclampsia. Few patients also presented with vision threatening complications such as serous retinal detachment, macular edema and cortical blindness. Presence of macular edema, papilloedema or retinal detachment are the warning signs for termination of pregnancy.

Keywords: Retinal changes, Pregnancy induced hypertension

Introduction

Pregnancy induced hypertension (PIH) is a hypertensive disorder in pregnancy that occurs in the absence of other causes of elevated blood pressure (140/90mmHg, or a rise of 30mmHg of systolic pressure, or a rise of 15mmHg of diastolic pressure), taken on two occasions after rest, in combination with generalized edema and/or proteinuria. When there is significant proteinuria it is termed as preeclampsia; seizures or coma as a consequence of PIH is termed as eclampsia. [1] The pathological changes of this disease appear to be related to vascular endothelial dysfunction and its consequences (generalized vasospasm and capillary leak). The retinal vascular changes generally, but not always, correlate with the severity of systemic hypertension. Vasospastic manifestations are reversible and the retinal vessels rapidly return to normal after delivery. [1]

Pregnancy is indeed a challenge to the human body and is associated with many physiological and pathological changes. Pregnancy-induced hypertension (PIH) is one of the most common complications of pregnancy and if not recognized early and treated appropriately, can seriously affect maternal and child health. The estimated incidence of eclampsia in European countries is one in 2000 pregnancies. [2] In India, the incidence of eclampsia ranges from 0.17 to 3.7% [3-5] and maternal mortality from 2.2 to 23% of all women with

eclampsia. [4-7] Young primigravidas, ignorance, poverty, lack of resources, and lack of adequate prenatal care in remote areas are the main social factors contributing to the high incidence of eclampsia in India. Undertreated eclampsia accounts for 75% of all maternal deaths [8] and causes irreversible blindness in 1-3% of affected cases. [9] Ocular manifestations affect up to 50% of patients with eclampsia and 25% of patients with severe pre-eclampsia. [10] Blurred vision, intermittent vision loss, diplopia, photopsia, and scotoma are the most common symptoms observed in cases of pre-eclampsia and eclampsia. Complete vision loss is uncommon but can occur due to visual cortex involvement, retinal detachment, or optic nerve atrophy. Focal or generalized arteriolar stenosis (70%) is the primary response to systemic arterial hypertension and has been described as the most common presentation in patients with PIH.

Pre-eclampsia/eclampsia is a multi-system disease that can affect end organs such as kidneys, liver, eyes, hemopoietic system, and placenta. Retinal involvement is fairly common but not always investigated. It's a known fact that the eye is a unique structure, wherein blood vessels can be visualized directly and non-invasively through the technique of fundoscopy. Fundoscopy is not only useful in assessing the condition of the eye and the effects of high blood pressure on the blood vessels of the retina but also to understand the effect of high blood pressure on other organs of the body including placental circulation and fetal health. [11] Therefore, it is very important that the attending physician/obstetrician seeks an ophthalmological examination in each and every case of PIH.

The aim of the present study was to assess the retinal changes among patients presenting with pregnancy induced hypertension.

Materials and Methods

This was a prospective observational study carried out in the Department of Ophthalmology, IGIMS, Patna, Bihar, India. 100 patients who fulfilled diagnostic criteria of PIH during a period of one year were enrolled for the study. Informed consent was taken and baseline data was recorded.

Inclusion Criteria

Diagnostic criteria of PIH:

1. Period of gestation >20 weeks

2. Blood pressure>140/90mm Hg

Exclusion Criteria

1. Patients who had a prior history of hypertension, diabetes mellitus, cardiovascular disease, and renal disease before pregnancy.

2. Patients having ocular media opacity which interfered with examination of fundus.

All the enrolled patients were initially evaluated by an obstetrician. Pregnancy induced hypertension was graded as preeclampsia (non severe and severe) and eclampsia according to ACOG criteria. [12]

Detailed history and ocular evaluation was done including: Visual acuity assessment with Snellen's chart and best corrected visual acuity. Fundus examination under mydriasis (plain tropicamide) was performed. Findings were recorded on retinal chart using standard colour coding. Changes suggestive of hypertensive retinopathy were recorded and graded using Keith Wagner Barker classification [13] into –

1. Grade I- Mild or moderate narrowing of smaller arterioles

2. Grade II - Moderate to marked narrowing of retinal arterioles, exaggeration of light reflex, changes at AV crossings.

3. Grade III - Prominent AV crossing changes, retinal edema, cotton wool spots, flame shaped haemorrhages.

4. Grade IV - Grade III changes with papilloedema.

Statistical Analysis

The data was coded and compiled on Microsoft Excel spread sheet. The data was analysed by chi-square test and unpaired t-test using SPSS software. A probability value (' p ' value) of <0.05 was considered as statistically significant.

Results

Table 1: Baseline characteristics

Age groups in years	N	%
20-25	35	35
26-30	40	40
31-35	15	15
36-40	10	10
Parity status		
Primigravida	64	64
Multigravida	26	26
Grand Multi	10	10

Preeclampsia		
Mild	36	36
Moderate	52	52
Severe	12	12

Most of the women belonged to 20-30 years of age group. 64 (64%) were primigravida, 26 (26%) were multigravida (2-4 pregnancies), and 10 (10%) were Grand Multi (5 or more deliveries). 36 (36%) patients had mild preeclampsia, 52 (52%) had moderate to severe preeclampsia and 12 (12%) had Eclampsia.

Table 2: Association of retinal changes with parity status and severity of disease

Parity status	No changes in fundus	Fundus changes	P Value
Primigravida	30	34	0.01
Multigravida	4	22	
Grand Multi	4	6	
Severity of disease			
Mild	25	11	
Moderate	12	40	
Severe	1	11	

Among primigravida patients 34 patients showed fundus changes while out of 26 patients who were multigravida 22 patients had retinal changes. We found a significant correlation between gravidity and retinal changes (p = 0.01). In our study, retinal changes were observed in 11 patients out of 36 patients with non severe preeclampsia, 11 out of 12 patients with severe preeclampsia and all eclampsia patients showed fundus changes.

Table 3: Grade of hypertensive retinopathy

Grade of hypertensive retinopathy	Number of patients	Percentage
No changes	35	35
Grade I	22	22
Grade II	32	32
Grade III	8	8
Grade IV	3	3
Serous RD	3	3

22 patients had grade I changes, 32 showed grade II changes, grade III and grade IV hypertensive changes was seen in 8 and 3 patients respectively. Six patients developed serous retinal detachment.

Discussion

Pregnancy induced hypertension (PIH) is considered when blood pressure rises more than 140/90 mmHg or a rise of 30 mmHg of systolic pressure, or a rise of 15 mm/Hg of diastolic pressure, taken twice after rest, in combination with generalized edema and/or proteinuria. [14] It occurs in 5-10% of all pregnancy. [12] Various retinal changes noted in these patients include spasm and focal/generalized narrowing of retinal arterioles, hemorrhages, exudates, peripapillary or focal retinal edema, serous retinal detachment, bilateral retinal detachment, acute ischemic optic neuropathy, retinal pigment epithelial lesions, temporary decrease in vision secondary to severe retinal arteriolar spasm and retinal edema, permanent blindness owing to central retinal artery occlusion and optic atrophy. [15]

Most of the women belonged to 20-30 years of age group. 64 (64%) were primigravida, 26 (26%) were multigravida (2-4 pregnancies), and 10 (10%) were Grand Multi (5 or more deliveries). 36 (36%) patients had mild preeclampsia, 52 (52%) had moderate to severe preeclampsia and 12 (12%) had Eclampsia. Karki et al [16] didn't come across any patients complaining of significant visual disturbances. Most of the patients had visual acuity between 6/6 and 6/9. Bharathi et al [17] in their study noted blurring of vision in 8(5.3%) cases and sudden loss of vision in 2 cases (1.3%). Among primigravida patients 34 patients showed fundus changes while out of 26 patients who were multigravida 22 patients had retinal changes. We found a significant correlation between gravidity and retinal changes (p = 0.01). In our study, retinal changes were observed in 11 patients out of 36 patients with non severe preeclampsia, 11 out of 12 patients with severe preeclampsia and all eclampsia patients showed fundus changes. 22 patients had grade I changes, 32 showed grade II changes, grade III and grade IV hypertensive changes was seen in 8 and 3 patients respectively. Six patients developed serous retinal detachment. 22 patients had grade I changes, 32 showed grade II changes, grade III and grade IV hypertensive changes was seen in 8 and 3 patients respectively. Six patients developed serous

retinal detachment. Rasdi et al [18] in their study of 50 patients found had grade I hypertensive retinopathy in 24 patients (48.0%), grade II changes in 21 patients (42.0%), grade III retinopathy in 4 patients (8.0%) and grade IV hypertensive retinopathy in 1 patient. Sadowsky et al [19] observed retinal vascular changes in 121 cases and noted grade 0 in 7 cases, grade I in

58 cases, grade II changes in 44 cases and grade III -IV changes in 12 cases. The findings in our study were in consonance with other studies conducted.

Tadin et al [20] in their study observed statistically significant association between the grades of hypertensive retinopathy and severity of pre-eclampsia ($p = 0.033$). Reddy et al [21] found that degree of retinopathy was directly proportional to severity of preeclampsia. Sadowsky et al [19] stated that there exists a correlation between retinal vascular changes and severity of toxemic condition. The proportion of severe cases of toxemia becomes progressively larger as the retinal changes become more severe. Bilateral exudative retinal detachment occurs along with hypertensive retinopathy. It occurs due to choroidal ischemia. The management of serous retinal detachment is termination of pregnancy after controlling blood pressure and vision can be saved in the affected eye. [22] Retinal pigment epithelial lesions, called Elscchnig spots, may also be found in preeclamptic patients with choroidal infarcts.[23] Presence of macular edema or papilloedema or retinal detachment are the warning signs for termination of pregnancy.

Conclusion

Diminution of vision was the most common visual symptom. 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 preeclampsia and eclampsia. Few patients also presented with vision threatening complications such as serous retinal detachment, macular edema and cortical blindness. Presence of macular edema, papilloedema or retinal detachment are the warning signs for termination of pregnancy.

References

1. Richard RO. Pregnancy induced hypertension (preeclampsia-ecclampsia) In: Schachat AP, Murphy RB, editors. Retina. 2nd ed. St Louis: Mosby; 1994. pp. 1405–1412.
2. Douglas KA, Redman CW. Eclampsia in the United Kingdom. BMJ. 1994 Nov 26;309(6966):1395-400.
3. NY V. A five year analysis of eclampsia. J Obstet Gynaecol India. 1989;34:513-5.
4. Eclampsia: maternal and perinatal outcomes in a tertiary care centre. Mor S, Sirohiwal D, Hooda R. J Obstet Gynecol India. 2007;57:324–326.
5. Das R, Biswas S. Eclapmsia: The Major Cause of Maternal Mortality in Eastern India. Ethiop J Health Sci. 2015 Apr;25(2):111-6.
6. Nobis PN, Hajong A. Eclampsia in India Through the Decades. J Obstet Gynaecol India. 2016 Oct;66(Suppl 1):172-6.
7. Bhattacharyya SK, Majhi AK, Seal SL, Mukhopadhyay S, Kamilya G, Mukherji J. Maternal mortality in India: a 20-year study from a large referral medical college hospital, West Bengal. J Obstet Gynaecol Res. 2008 Aug;34(4):0020499-503.
8. World Health Organization. Maternal mortality: Fact sheet.
9. Abu Samra K. The eye and visual system in the preeclampsia/eclampsia syndrome: What to expect? Saudi J Ophthalmol. 2013 Jan;27(1):51-3.
10. Dieckmann WJ. Toxemias of pregnancy.
11. Indu B, Prasannakumary C, Prabhu PB, Babitha JP. Ocular manifestations in severe pregnancy induced hypertension. J Med Sci Clin Res. 2018;6:696-700.
12. Cunningham FC, Leveno KJ, Bloom SL, Spong CY, Dashe JS, et al. Newyork:Mc Graw-Hill. Williams Obstetrics. 2014;p. 728–69. 24th ed.
13. Keith NM, Wagener HP, Barker NW. Some different types of essential hypertension. The American Journal of the Medical Sciences. 1939;197(3):332-43.
14. Sheth BP, Mieler WF. Ocular complications of pregnancy. Current opinion in ophthalmology. 2001 Dec 1;12(6):455-63.
15. Ober RR. Preclampsia-eclampsia syndrome. In: Ryan SJ, editor. Retina. 4th ed. . China:Elsevier Mosby: Elsevier Mosby ; 2006.
16. Karki P, Malla P, Das H, Uprety DK. Association between pregnancy-induced hypertensive fundus changes and fetal outcomes. Nepalese Journal of Ophthalmology: a Biannual Peer-reviewed Academic Journal of the Nepal Ophthalmic Society: NEPJOPH. 2010 Jan 1;2(1):26-30.
17. Bharathi NR, Raju NR, Prasad PK, Raju RS, Mayee K. Fundus changes in pregnancy induced hypertension: a clinical study. Journal of Evolution of Medical and Dental Sciences. 2015 Jan 29;4(9):1552-63.
18. Batas K. Hypertensive retinopathy and visual outcome in hypertensive disorders in pregnancy. Med J Malaysia. 2011 Mar;66(1):43.
19. SADOWSKY A, SERR DM, LANDAU J. Retinal changes and fetal prognosis in the toxemias of pregnancy. Obstetrics & Gyneco logy. 1956 Oct 1;8(4):426-31.
20. Tadin I, Bojić L, Mimica M, Karelović D, Đogaš Z. Hypertensive retinopathy and pre-

eclampsia. Collegium antropologicum. 2001 Jul 23;25(1):77-81.
21. Reddy SC, Nalliah S, Who TS. Fundus changes in pregnancy induced hypertension. International journal of ophthalmology. 2012 ;5(6):694.
22. Oliver M, Uchenik D. Bilateral exudative retinal detachment in eclampsia without hypertensive retinopathy. American Journal of Ophthalmology. 1980 Dec 1;90(6):792-6.
23. Saito Y, Tano Y. Retinal pigment epithelial lesions associated with choroidal ischemia in preeclampsia. Retina (Philadelphia, Pa.). 1998 Jan 1;18(2):103-8.