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Retinal Changes in Pregnancy Induced Hypertension and Its Impact on Vision

Sudhir Babu P.[1], Beatrice C.H.[2], Shilpa[3], Sunita Sudhir P.[4], G. Amaresh[5]

[1]Professor and Head [2]Assistant Professor [3]Resident [5]Professor, Dept of Ophthalmology, [4]Associate Professor, Dept of Obstetrics and Gynaecology, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda, Karnataka 508254, India.

Abstract

Introduction: Pregnancy Induced Hypertension (PIH) is an entity involving multiple systems, changes during pregnancy bring about many alterations in human body which are reversible. PIH in turn has got its effect on the visual system of the eye involving the retinal vasculature and producing myriad signs and symptoms. *Purpose*: This study was undertaken to bring out the various retinal changes in pregnancy and their post partum reversal time. *Materials and Methods*: This was a prospective study done on 100 patients with Pregnancy Induced Hypertension (PIH) who were referred to Department of Ophthalmology, KIMS, Narketpally, from October 2015 to September 2016. Detailed ocular examination including fundoscopy was done in all 100 patients and results were interpreted. *Results*: Out of 100 patients of pregnancy-induced hypertension (PIH) 16 were gestational hypertension patients, 60 were pre-eclamptic patients and 24 were eclamptic patients. Headache was the most common symptom encountered in 68% of cases Visual disturbances were seen in 16% of cases .percentage of patients developing retinopathy due to PIH increased as we moved from mild preeclampsia group to eclampsia group. The relationship between retinal changes and severity of PIH was statistically significant (<0.0001) . Grade 4 retinopathy changes were seen in systolic blood pressure >180mm of Hg and diastolic blood pressure > 120 mm Hg. The percentage of patients developing severe retinopathy changes due to PIH was directly proportional to BP. Range of gestational age at which most of the patients developed PIH was from 30-34 weeks .Pregnancy induced retinopathy changes were seen more in primigravidas. Reversal of signs and symptoms l occurred in all the cases by 10 weeks postpartum. *Conclusion*: We conclude that fundus changes in PIH are proportional to severity of PIH and BP, all signs and symptoms including visual acuity are reversible with proper control of PIH and periodic fundus examination and follow up is mandatory to prevnent complications..

Keywords: PIH-Pregnancy Induced Hypertension; Pre-Eclamsia; Eclamsia; Post-Partum; Visual Acuity.

Introduction

Pregnancy is associated with group of physiological and pathological changes in body. most important pathology accompanying pregnancy is Pregnancy Induced Hypertension(PIH). Pregnancy induced hypertension involves multiple system including Cardiovascular system, Hepatic and renal and Neurologic system with Hematologic changes [1]. It can also affect the retinal vasculature & the visual pathway upto the visual cortex. Retinal vascular changes are associated with severity of hypertension and these changes are reversible and return to normal after delivery.

Pregnancy Induced Hypertension is defined as recording of hypertension (blood pressure at least

Corresponding Author: Sudhir Babu P.,
Professor and Head, Dept of Ophthalmology
Kamineni Institute of Medical Sciences, Narketpally
Nalgonda, Karnataka 508254, India.
E-mail: spadgul@gmail.com

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140 mmHg systolic and/or 90mmHg diastolic) on at least two occasions, at least 6 hours apart after 20th week of gestation , in women known to be normotensive before and before 20 weeks of gestation [2].

Hypertension in pregnancy can be classified as [3].

1. Chronic pre existing hypertension
2. Gestational hypertension
3. Pre eclampsia
4. Eclampsia

The incidence of PIH is 10% and eclampsia affects 5% leading to 17.2% of maternal mortality and 22% of fetal mortality [4]. Preeclampsia occurs in 5% of first pregnancies [5]. Ocular involvement is common in PIH occurring in as many as 30 -100% of patients [6]. Progression of retinal changes correlates progression of PIH and foetal mortality due to similar vascular ischemic changes in Placenta [7-10]. This study was undertaken to study the retinal changes seen in pregnancy induced hypertension.

Aim

Retinal changes in Pregnancy Induced Hypertension and its impact on vision

Objectives

1. To study retinal changes in pregnancy induced hypertension.
2. To study relationship between pregnancy induced hypertensive retinopathy changes and severity of PIH.
3. To study relationship between pregnancy induced hypertensive retinopathy changes and blood pressure.
4. To study the reversal of retinal changes in postpartum period in pregnancy induced hypertension.
5. To study the visual acuity changes in PIH and its impact with respect to reversal of normal.

Materials & Methods

This prospective study was undertaken in patients who were referred to the Department of Ophthalmology Kamineni Institute of Medical Sciences, Narketpally. The study was conducted from october 2015 to September 2016. A total of 100 cases of PIH were enrolled into the study after taking informed consentand institutional ethicsl committee clearance. Complete Ocular examination was done in all cases. Stable patients were examined in Ophthalmology Department. In patients who were unstable- bed side evaluation was done. Visual acuity was recorded , any improvement with pin hole was noted and retinoscopy was done. Slit lamp examination was done and fundoscopy done after attaining mydriasis using Tropicamide 0.5% eye drops. Both direct and indirect Ophthalmoscopy were done . Fundus findings were documented with colour coding. Postpartum ocular examination was repeated after 10th week of delivery. Fundus findings and visual acuity with or without correction of refractive error if any were documented and observations were analysed for reversal of signs and symptoms including visual acuity after delivery.

Grading of hypertensive retinopathy was done as per (SCHEIE'S) [11] classification

Grade 0 - No changes

Grade 1 - Barely detectable arteriolar narrowing

Grade 2 - Obvious arteriolar narrowing with focal irregularities

Grade 3- Grade 2 plus retinal hemorrhages and/ or exudates

Grade 4- Grade 3 plus papilledema

The results were analyzed using SPSS software (19th version). Chi-square test was used to determine the association between the retinal changes and blood pressure and severity of PIH. P value < 0.0001 was taken as significant.

Results

Out of 100 patients of pregnancy-induced hypertension (PIH) 16 were gestational hypertension patients, 60 were pre-eclamptic patients and 24 patients were eclamptic. Headache was the most common symptom encountered in 68% of cases. Visual disturbances were seen in 16% of cases. Retinal changes were observed in 52% of cases. In 24 eclampic cases 16 had grade-2, 8 had grade-3 hypertensive retinopathy, 4% of cases had grade-4 hypertensive retinopathy. Out of 60% preeclamptic patients 32 % of cases had grade 0, 16% of cases had grade 1, 8% of cases had grade 2, 4% of cases had grade 3 hypertensive retinopathy changes. Out of 24% eclamptic patients 8% had grade 1, 8% had grade 2, 4% had grade 3, 4% had grade 4 . Retinopathy due to PIH increased as we moved from mild

preeclampsia group to eclampsia group. The relationship between retinal changes and severity of PIH was statistically significant (<0.0001). Retinopathy was more common in the age group of 23-27yrs. There was Association between the presence of retinal changes and age was statistically not significant (p= 0.706). Grade 4 retinopathy changes were seen with systolic blood pressure >180mm of Hg and diastolic blood pressure > 120 mm Hg. The percentage of patients developing severe retinopathy changes due to PIH was directly proportional to BP. Range of gestational age at

Table 1: Age Distribution in Study Group

Age	No Cases	%
18-22	20	20
23-27	40	40
28-32	27	27
>32	13	13
Total	100	100

In this study of 100 patients, 40% patients were between 23-27 years of age, followed by 27% patients between 28-32 years of age, mean age group was 29.67 years

Table 2: Gestational Age

Gestational Age in weeks	No. of cases	%
20-24	20	20
25-29	24	24
30-34	32	32
>34	24	24
Total	100	100

In this study of 100 patients, maximum patients 32% were between 30-34 weeks of gestation and minimum patients are between 20-24 weeks of gestation.

Table 3: Gravida

Gravida	No of cases	%
G1	57	57
G2	24	24
G3	14	14
G4	5	5

In the present study of 100 cases, 57% were primigravidas followed by 24% were Gravida II.

Table 4: Symptoms at The Time Of Presentation and reversal at 10 weeks post partum

Symptoms	No of cases	%	10 Weeks n =86
Headache	68	68	68
Blurred vision	16	16	16
Photopsia	4	4	4
Diplopia	2	2	2
None	32	32	-

Headache was the most common symptom in about 68% of patients, followed by blurred vision in 16% of patients

Table 5: Visual Acuity

Visual acuity	No. of cases	%	10 Weeks
6/6	72	72	93
6/9	12	12	7
6/18	8	8	-
6/24	3	3	-
6/36	2	2	-
6/60	2	2	*
<6/60	1	1	*
Total	100	100	100

72% of patients had 6/6 and 16% of patients had decreased vision <6/9 which improved to 6/6 at 10 weeks post partum.
*3 cases had Pre- existing refractive error which improved to 6/6 with correction at 10 weeks post partum.

Table 6: Severity of PIH

Severity of PIH	No. of cases	%
Gestational Hypertension	16	16
Pre eclampsia	60	60
eclampsia	24	24
Total	100	100

60% of the patients were pre-eclamptic and 24% patients were having eclampsia.

Table 7: Grading of Retinopathy

Grades of retinopathy	No of cases	%
Grade -0	48	48
Grade -1	24	24
Grade -2	16	16
Grade -3	8	8
Grade -4	4	4
total	100	100

Retinopathy changes were observed in 52 patients , in which 24% of patients had grade 1 retinopathy changes.

Table 8: Severity of Preeclampsia and Retinopathy

Severity of PIH	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Total
Gestational Hypertension	16(16%)	0	0	0	0	16(16%)
Pre -Eclampsia	32	16(16%)	8(8%)	4(4%)	0	60(60%)
Eclampsia	0	8(8%)	8(8%)	4(4%)	4(4%)	24(24%)
Total	48(48%)	24(24%)	16(16%)	8(8%)	4(4%)	100

*p value <0.0001 (chi square test) statistically significant

Table 9a: Severity of PIH and systolic BP.

Severity of PIH	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Total
140 -150	32 (32%)	16(16%)	4(4%)	0	0	52(52%)
151-160	12(12%)	4(4%)	4(4%)	0	0	20(20%)
161-170	4(4%)	4(4%)	0	4(4%)	0	12(12%)
171-180	0	0	8	4(4%)	0	12(12%)
>180	0	0	0	0	4(4%)	4(4%)
total	48(48%)	24(24%)	16(16%)	8(8%)	4(4%)	100

*p value <0.0001 (chi square test) statistically significant

Table 9b: Severity of PIH and diastolic BP

Severity of PIH	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Total
90 -100	40	20	8	0	0	68
101-110	8	4	8	4	0	24
111-120	0	0	0	4	0	4
>120	0	0	0	0	4	4
Total	48	24	16	8	4	100

*p value <0.0001 (chi square test) statistically significant

which most of the patients developed PIH was from 30-34 weeks. Pregnancy induced retinopathy changes was seen more in primigravidas. The relationship between retinal changes due to PIH and blood pressure (<0.0001) was statistically significant. Reversal of Signs: 86 patients had symptoms related to PIH out of which headache was most common, seen in 68% of patients followed by decreased visual acuity <6/9 seen in 16 patients which improved to 6/6 at 10 weeks post partum, out of which 3 cases had Pre- existing refractive error which improved to 6/6 with correction at 10 weeks post partum. There was total reversal of symptoms in all 100 cases at 10 weeks postpartum.

Discussion

In present study, 52% of patients with pre eclampsia and eclampsia had retinal changes, Reddy SC et al [12] in their study reported occurrence of retinopathy changes as 45% , Sagili et al [13] reported it to be 59%, and Rajalaxmi kamath et al [14] reported as 60%. Sunness JS [15] and Beck RW et al [16] observed retinal changes in 40-100% patients with pre-eclampsia.

Severity of PIH: In present study, out of 52% of patients with pregnancy induced hypertensive retinopathy changes, 24% of patients had grade 1 retinopathy changes and Grade 4 retinopathy changes were seen in 4% of cases. Degree of pregnancy induced hypertensive retinopathy was directly proportional with severity of preeclampsia (P value-<.0001 significant). S C Reddy et al [12] observed retinopathy was seen in 59% of cases and maximum number of cases were of Grade I hypertensive retinopathy (52.6%) there was positive association between retinal changes and blood pressure (p=.001). Exudative retinal detachmaent is seen rarely in PIH patients. It is thought to be caused by choroidal ischemia [17]. Retinal detachment is seen in 1-2% of all patients with PIH [18]. No of cases of retinal detachment in our study was Nil. In the present study, retinal hemorrhages, A/V nipping, cotton wool spots and hard exudates were seen which was comparable to Mithila et al [28] and Rasdi et al study.

Presentation: In the present study, 68% of patients had headache as one of the complaints while approximately 16% of patients complained of visual symptoms like decreased vision, flashes of light, and diplopia.

Visual Acuity: A.R Rasadi observed , 96.7% of patients had visual acuity of 6/6 in both eyes and 3.3% had visual acuity of 6/9 [19]. In Mithila et al [28] study, 98% of patients had visual acuity of 6/6 and 2% had vision of 6/9.In present study 84% of patients had visual acuity between 6/6 and 6/9 and 16 patients had visual acuity less than 6/9 out of which 3 patients had refractive error <6/60 which was attributed to pre existing myopia. All the patients gained vision of 6/6 during 10 weeks postnatal follow up. The etiology of vision loss in cortical blindness may be due to occipital ischemia in watershed areas [20-23]. Cortical blindness was not seen in this study which was comparable to Shah et al [24] and Reddy et al [25]. This may be due to early detection and prompt treatment.

Age: In this present study of 100 patients, 40% patients were between 23-27 years of age mean age of the cases were 29.67 years which was comparable to previous study done by Sagili et al [13], Smitha et al [26] and Shah et al [24]. Rajalaxmi kamath et al [14] in her study observed 60.8%of patients with retinopathy changes were in the age group between 26-40 years [14]. In Reddy et al study [12] 56% of patients with retinopathy changes were in the age group between 26-40 years mean age of the patient was 30.2 years.

Gestational Age: In present study, range of gestational age at which most of the patients developed PIH was from 30-34 weeks. Cunnigham et al [3], reported average gestational age as 34 weeks [3]. Rajalaxmi kamath et al [14] reported the gestational age when pre-eclampsia and Eclampsia developed as between 24-41 wks.

Gravida: In the present study of 100 patients with pregnancy induced hypertension 57% of patients were primigravidas. This result of present study is comparable to shah et al [24], Mithila et al [28] 74% were primigravidas and 26% were multigravidas which have concluded that PIH is more common in primigravidas. Rajalaxmi kamath et al [14] in her study observed 65% of cases were Primigravida and 35 % of patients were multigravida.

Retinopathy and Hypertension: There was significant association between retinopathy changes and blood pressure readings , Retinopathy changes were mostly seen in systolic blood pressure between 140-150mm Hg(52%) and diastolic blood pressure between 90-100(68%). Grade 4 hypertensive retinopathy was seen in patients with systolic blood pressure >180 mm of Hg and diastolic blood pressure >120mmHg. In Shah et al study [24], 72 patients had <160 mmHg systolic and <100 mmHg diastolic blood pressure, 4 (5.56%) patients had developed hypertensive retinopathy changes while out of 78 patients who had >160 mmHg systolic and/or >100mmHg diastolic blood pressure, 14 (17.95%) patients developed hypertensive retinopathy changes. Mithila et al [28] in her study observed mean systolic pressure of 156.9±17.96 and mean diastolic blood pressure of 104.88±13.58. S C Reddy et al in his study documented statistically significant association between retinopathy and degree of hypertension. In our study association between retinopathy and degree of systolic and diastolic BP was statistically significant (p<0.0001).

Reversal of Retinopathy: In Rajalaxmi kamath et al [14] study, 60% had retinopathy changes before delivery. When fundus examination was repeated on 10th postpartum day in patients who showed retinal changes in the ante partum period had normal

fundus. Other 5% in whom the changes persisted were lost in further follow up [14]. In this study, out of 52% of patients with retinopathy changes, 94.2% had normal fundus at 6th week of post partum period and remaining 5.7 % had normal fundus at 10th week of post partum period. This shows that retinopathy changes due to pregnancy induced hypertension usually returned to normal by 10th week of post partum period.

Conclusion

With this study we conclude that Pregnancy Induced Hypertension is associated with various ocular and retinal changes, retinal changes are directly proportional to severity of PIH, Systolic BP and Diastolic BP all signs and symptoms including visual acuity are reversible in post partum period. except in cases of retinal detachment and cortical blindness which can avoided by proper control of PIH in conjunction with periodic fundoscopy and follow up.

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