

Clinical study of retinal changes in pregnancy induced hypertension

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妊娠性高血压视网膜变化的临床研究

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摘要

目的:研究妊娠性高血压(PIH)患者视网膜变化的患病率,视网膜变化与疾病严重程度的相关性。

方法:横断面研究。共收集2014-12/2015-05妊娠性高血压患者100例。所有患者均行眼底检查。单眼或双眼眼底发生变化视为阳性。妊娠性高血压分级为轻度子痫前期(血压>140/90~160/90 mmHg),重度子痫前期(血压>160/90 mmHg)和子痫前期(重度子痫前期和抽搐)。

结果:患者平均年龄为23.05(19~34)岁。妊娠期为28~41wk。其中62例初产妇以及38例经产妇。轻度子痫前期,重度子痫前期和子痫前期患者占比分别为62%,26%,12%。8例患者发生视网膜变化。观察得出:高血压性视网膜病变I级(1%),II级(0%),III级(2%),IV级(2%),浆液性视网膜脱离(1%)和中心性浆液性脉络膜视网膜病变(2%)。视网膜变化与PIH严重程度呈正相关,有统计学意义($P=0.0001$)。

结论:8%的PIH患者视网膜发生变化,视网膜变化与PIH严重程度呈正相关。

关键词:妊娠性高血压;视网膜变化;高血压性视网膜病变

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Abstract

• **AIM:** To determine the prevalence of retinal changes in pregnancy induced hypertension (PIH) patients and to correlate between retinal changes and the severity of

disease.

• **METHODS:** A cross-sectional observation study was conducted in 100 PIH patients over a period of 6mo (Dec 2014 - May 2015). Fundus examination was done in all patients. Fundus changes in right or left or both eyes was taken as positive. The PIH graded as mild pre-eclampsia (BP >140/90 to 160/90 mmHg), severe pre-eclampsia (BP>160/90 mmHg) and eclampsia (severe pre-eclampsia and convulsions).

• **RESULTS:** Mean age was 23.05y (19-34y). Gestation period ranged from 28 to 41wk. Sixty-two were primi gravida and 38 were multigravida. 62%, 26%, 12% of patients had mild, severe pre-eclampsia, eclampsia respectively. Retinal changes were identified in 8 patients. Grade I, Grade II, Grade III, Grade IV hypertensive retinopathy (HTR), serous retinal detachment (SRD) and central serous chorioretinopathy (CSCR) observed in 1%, 0%, 2%, 2%, 1% and 2% of patients respectively. There was a statistically significant positive association of retinal changes and severity of the PIH ($P=0.0001$).

• **CONCLUSION:** Retinal changes were seen in 8% of patients with PIH and there is a positive correlation between retinal changes and severity of PIH.

• **KEYWORDS:** pregnancy induced hypertension; retinal changes; hypertensive retinopathy

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INTRODUCTION

Hypertensive disease occurs in 5% -15% of all pregnancies. Pregnancy induced hypertension (PIH) is a hypertensive disorder in pregnancy that occurs in the absence of other causes of elevated blood pressure (BP140/90 mmHg, or a rise of 30 mmHg of systolic pressure, or a rise of 15 mmHg of diastolic pressure), taken on two occasions after rest, in combination with generalized oedema and/or proteinuria^[1]. Risk factors for pre-eclampsia include very young or advanced maternal age, multiple pregnancy, haemolytic disease of newborn, diabetes mellitus, chronic systemic hypertension and renal disease^[2].

The retinal vascular changes generally but not always, correlate with the severity of systemic hypertension and vasospastic manifestations are reversible and the retinal vessels

Table 1 Distribution of severity of disease and retinal changes

Severity of disease	Grade I HTR	Grade II HTR	Grade III HTR	Grade IV HTR	Serous RD	CSCR	n(%)
Mild pre-eclampsia	0	0	0	0	0	0	
Severe pre-eclampsia	1(3.84)	0	2(7.69)	1(3.84)	0	1(3.84)	
Eclampsia	0	0	0	1(8.33)	1(8.33)	1(8.33)	

HTR: Hypertensive retinopathy; Serous RD: Serous retinal detachment; CSCR: Central serous chorioretinopathy.

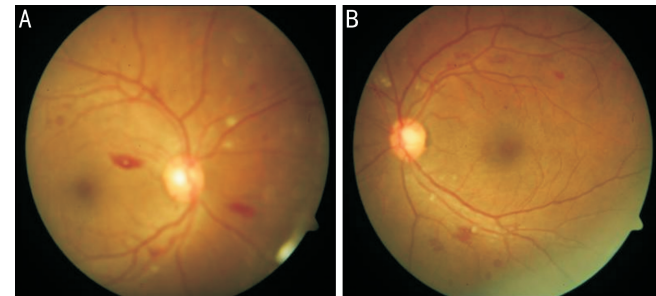


Figure 1 Grade III hypertensive retinopathy A: Right eye fundus showing Grade III hypertensive retinopathy (disc normal, arteriolar attenuation, A-V crossing changes seen in inferior quadrant, flame shaped and blot haemorrhages and cotton wool spots seen); B: Left eye fundus showing grade III hypertensive retinopathy, (disc normal, arteriolar attenuation, A-V crossing changes seen in inferior quadrant, blot haemorrhages and cotton wool spots seen in superior and inferior quadrants)

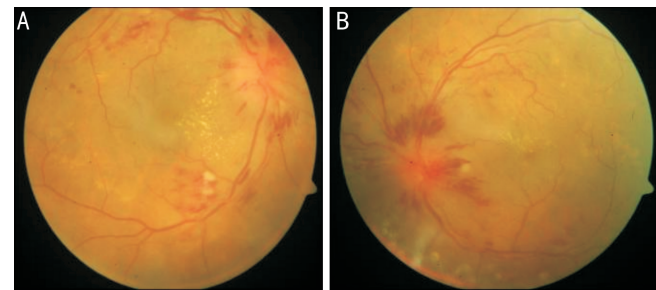


Figure 2 Grade IV hypertensive retinopathy A: Right eye fundus showing Grade IV Hypertensive retinopathy, (disc oedema, splinter haemorrhages over disc, hard exudates nasal to macula in macular fan pattern, arteriolar attenuation, A-V crossing changes, flame shaped and blot haemorrhages seen in superior and inferior quadrants and cotton wool spots seen in inferior-temporal quadrant); B: Left eye fundus showing Grade IV hypertensive retinopathy, (disc oedema with hyperemia, splinter haemorrhages over disc, arteriolar attenuation, A-V crossing changes, flame shaped and blot haemorrhages seen in superior and inferior quadrants).

rapidly return to normal after delivery^[1]. Clinical evidence of vasospasm may be obtained by ophthalmologic examination and the various pathological changes in different organs of body can be studied by directly studying the ocular fundus and it may give a true index of changes in vascular system of other organs like brain and kidneys as well^[3].

Since retinal changes like hypertensive retinopathy, central serous chorioretinopathy, retinal detachment are prevalent in patients with pregnancy induced hypertension (PIH) and are not diagnosed, this study was conducted to know the prevalence of fundus changes and to correlate these changes



Figure 3 Central serous chorioretinopathy Disc normal with physiological cupping of about 0.5 CD, macula shows ring sign due toneurosensory detachment.

with the levels of blood pressure, since timely ophthalmoscopy in all cases of PIH will affect the decision of induction of delivery and prevention of other complications.

SUBJECTS AND METHODS

A cross-sectional observation study was conducted in 100 PIH patients over a period of 6mo (Dec. 2014-May 2015). All patients who were diagnosed with PIH were included in study. Patients with pre-existing hypertension, diabetes, renal diseases, severe anaemia, connective tissue disorders, high myopia, hazy media like cataract and corneal opacities were excluded from study.

After taking informed consent age, race, para, gravida, blood pressure were noted from the case records and history for any eye symptoms is asked for. Anterior segment was examined. Both pupils were dilated using 1% tropicamide. Fundus examination was done in all patients with indirect ophthalmoscope. Fundus changes seen in right or left or both eyes, was taken as positive findings.

The severity of PIH was classified into pre-eclampsia (mild and severe) and eclampsia, based on the following findings: the PIH graded as mild pre-eclampsia (BP>140/90-160/90 mmHg), severe pre-eclampsia (BP > 160/90 mmHg) and eclampsia (severe pre-eclampsia and convulsions)^[1,4-5]. All the findings were noted on a data sheet.

The retinal changes (hypertensive retinopathy) were graded according to Keith Wagener classification into: Grade I - mild generalized arterial attenuation, particularly of small branches; Grade II - more severe Grade I +focal arteriolar attenuation, A-V crossing; Grade III-Grade II+ hemorrhage, hard exudates, cotton wool spots; Grade IV-Grade III +optic disc swelling (papilloedema)^[6].

RESULTS

A total of 100 PIH patients were examined. Mean age was

23.05y (19–34y). Gestation period ranged from 28 to 41wk. Sixty-two were primi gravida and 38 were multigravida. The 62% of patients had mild, 26% of patients had severe pre-eclampsia and 12% of patients had eclampsia.

Retinal changes were identified in 8 patients and the rest 92 patients had no changes in the retina. Out of 8 patients with retinal changes, 5 (62.5%) had severe pre-eclampsia and 3 (37.5%) had edampsia.

Grade I hypertensive retinopathy in 1%, Grade II hypertensive retinopathy in 0%, Grade III hypertensive retinopathy in 2% (Figure 1), Grade IV hypertensive retinopathy in 2% (Figure 2), serous retinal detachment in 1% (Figure 3) and central serous chorioretinopathy (CSCR) were observed in 2% of patients. Different grades of retinal changes seen in severe pre-eclampsia and eclampsia are shown in Table 1. There was statistically significant positive association of retinal changes and severity of the PIH ($P = 0.0001$).

Patient with serous retinal detachment (RD) was a 22y old primigravida with 28wk of gestation with eclampsia (BP190/110 mmHg with convulsions) who complained of sudden diminution of vision in both eyes. Vision in both eyes was hand movements positive. Fundus picture showed bilateral serous RD involving peripapillary area and posterior pole. Patient developed HELLP syndrome. Hence patient was referred to tertiary care center and lost for follow-up.

One patient with CSCR was a 29y old G4P1 (Gravida 4 and Para 1) with 39wk of gestation with severe pre-eclampsia (BP180/100 mmHg) who complained of sudden diminution of vision in both eyes right eye (RE) > left eye (LE). Best corrected visual acuity (BCVA) in RE was 6/60 and in LE 6/24. Fundus picture showed CSCR in both eyes RE > LE. Pregnancy was terminated. Following delivery CSCR resolved completely in 3wk with 6/6 BCVA in both eyes.

Another patient with CSCR was a 20y old primigravida with 37wk of gestation with severe pre-eclampsia (BP170/100 mmHg) who complained of sudden diminution of vision in LE. BCVA in RE 6/6 and LE 6/60. Fundus picture showed CSCR in LE. Pregnancy was terminated. Following delivery CSCR resolved completely in 2wk with 6/6 BCVA.

DISCUSSION

Our study highlights the importance of timely ophthalmoscopy which helps to assess severity of disease, which affects the decision of induction of delivery and to predict and prevent possible complications which in turn immensely helps in judicious management of disease.

Reddy *et al*^[1] found positive association of retinal changes and blood pressure ($P = 0.001$), proteinuria ($P = 0.018$) and severity of the PIH ($P = 0.024$). Retinal changes (Grade I and II hypertensive retinopathy) were seen in 59% of patients with PIH and they were significantly associated with

blood pressure, proteinuria and severity of the disease, hence fundus examination helps in assessing the severity of PIH.

In a study conducted by Satwant *et al*^[7] positive correlation was found between grade of PIH and retinal changes. Most changes were observed in severe PIH and grade of PIH from gestational age of 24th to 34th week can be used in assessment of retinal changes.

Tadin *et al*^[8] found degree of hypertensive retinopathy directly proportional with the severity of pre-eclampsia and significant correlation was found between them and concluded that the examination of the fundus is a valuable and necessary diagnostic procedure in pregnant women with pre-eclampsia. Ranjan *et al*^[9] observed fundus changes in 40% of patients with hypertensive disease of pregnancy.

In a study conducted by Kamath *et al*^[3] 60% of patients with pre-eclampsia showed fundal changes.

Bharathi *et al*^[4] in their study found that the degree of retinopathy correlated with the severity of the disease and levels of hypertension and the prevalence of fundus changes in PIH is 23.33%.

Our study also showed statistically significant association between severity of disease and retinal changes ($P = 0.0001$) and found prevalence of retinal changes in PIH patients is 8%. Prevalence was less when compared to other related studies because of good antenatal care.

With improved medical and obstetrical management of hypertension and other aspects of pre-eclampsia, retinal changes in pre-eclampsia significantly less frequent compared to past^[2].

Viquil-De Gracia and Ortega-Paz^[10] searched in MEDLINE for case reports of retinal detachment associated with pre-eclampsia/eclampsia and a total of 28 retinal detachment associated with PIH were identified, 15 were associated with severe pre-eclampsia (3 HELLP syndrome), 9 with HELLP syndrome, 2 with eclampsia, and 2 with both HELLP syndrome and eclampsia.

Retinal changes were seen in 8% of patients with PIH and there was a positive correlation between retinal changes and severity of PIH. Vision threatening changes like serous RD and CSCR were seen in 3% of the cases and are at increased risk of systemic morbidity and adverse pregnancy outcome.

It is important to do timely fundus examination in all patients with PIH since retinal changes reflect the condition of other major organs like brain and kidneys and help in management of disease and its complications.

Hence fundus examination forms a valuable and necessary diagnostic procedure in every patient with PIH and prompt termination in patients at increased risk will prevent maternal complications and improve fetal outcome.

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