

A Case Report of Fundus Changes in Preeclampsia

Dr. Ganesh Sathyamurthy¹, Dr. Amulya P.², Dr. Gogula Mounika Kumari^{3*}, Dr. Monisha Chowdary⁴

¹Associate Professor, Department of Ophthalmology, Rajarajeswari Medical College and Hospital, Bengaluru

²Senior Resident, Department of Ophthalmology, Rajarajeswari Medical College and Hospital, Bengaluru

^{3,4} Junior Resident, Department of Ophthalmology, Rajarajeswari Medical College and Hospital, Bengaluru

*Corresponding Author: Dr. Gogula Mounika Kumari

Abstract: ***Purpose:** To report a case of fundus changes in preeclampsia. **Method:** A 30 year old pregnant female came with complaints of blurring of vision in both eyes. Detailed examination including history, visual acuity, anterior segment examination (ASE), fundus examination and optical coherence tomography (OCT) were recorded. **Result:** A 30 year old G2P1L1 came with complaints of blurring of vision in both eyes since 1week, with a blood pressure of 200/120mmhg. Emergency LSCS was performed. Visual acuity was reduced and dilated funduscopy showed multiple cotton wool spots in both eyes while OCT showed macular edema. Patient was followed up for 6weeks during the course of which, the visual acuity, fundus and OCT showed improvement, while the blood pressure was under control. **Conclusion:** Hypertensive disorders of pregnancy were classified into pre-eclampsia, eclampsia, gestational hypertension, chronic hypertension and chronic hypertension with superimposed pre-eclampsia. Arteriolar narrowing, exudates and macular edema are few features and serous retinal detachment is the rare complication. Routine fundus examination after the diagnosis of preeclampsia is essential for monitoring of changes in retinal vasculature and in turn fetal vasculature.*

Keywords: pregnancy induced hypertension, preeclampsia, hypertensive retinopathy, macular edema, serous retinal detachment

1. Introduction

Pregnancy induced hypertension (PIH) is a hypertensive disorder in pregnancy that occurs in the absence of other causes of elevated blood 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. The pathological changes of this disease appear to be related to vascular endothelial dysfunction and its consequences. The retinal vascular changes generally, correlate with the severity of systemic hypertension. Vasospastic manifestations are reversible and the retinal vessels rapidly return to normal after delivery.

Retinopathy in pregnancy is a term that defines the retinal pathologies seen uniquely in pregnancy or more commonly in conditions that may worsen or alter during pregnancy as a result of hematologic and metabolic changes. During pregnancy, elevated blood pressure poses various risks to both the mother and the fetus, including placental abruption, intrauterine growth retardation, premature delivery, future cardiovascular diseases and injury to other organs including the eye.

Ocular involvement is common in most cases of hypertensive disorders of pregnancy. Common symptoms are blurry vision, photopsia, scotomas and diplopia. The global prevalence of hypertensive disorders of pregnancy ranges between 5% and 10% and fundus changes are seen in 40%-100% of these patients.

2. Material and Methods

This is a case report of a pregnant woman who came to Rajarajeswari Medical College and Hospital, Bengaluru, diagnosed with preeclampsia with retinopathy changes. Detailed ocular and systemic examination were done to rule

out any other abnormalities, which included history, visual acuity using Snellen's chart, color vision test using Ishihara charts, anterior segment examination using slit lamp, intra-ocular pressure using non-contact tonometer, dilated funduscopy using indirect ophthalmoscope, Optical Coherence Tomography (OCT).

History: A 30-year-old female G2P1L1 with 9 months of amenorrhea presented with complaints of blurring of vision in both eye since 1 week, which is sudden in onset, gradually progressive, associated with headache. Patient does not give any history of pain, redness, floaters or trauma. Patient gives history of spectacle usage for the past 5 years. No history of usage of any eye drops. She is a known case of preeclampsia since past 4 months. She is not a known case of diabetes, asthma, chronic obstructive pulmonary disease [COPD], ischemic heart disease. Previous pregnancy was uneventful.

On examination, patient had a blood pressure of 200/120mmhg following which labetalol infusion was started. Laboratory investigations showed proteinuria 2+. The patient's blood pressure was constantly above 180/90mmhg, due to which an emergency lower segment caesarean section was performed at 36 weeks of gestation.

The patient presented to the Ophthalmology OPD at post-op day 4 with the above complaints.

Visual Acuity of the patient is as follows:

Table 1: Visual Acuity by Snellen's chart

	Right Eye	Left Eye
Unaided Vision	cf@2mt	cf@1mt
Pinhole Improvement	NI	NI
Aided Vision	cf@2mt	cf@1mt
Near Vision	<N ₃₆	<N ₃₆
Colour Vision	Normal	Normal

Objective and subjective refraction of the patient revealed that she is a moderate myope of -4D OD and -5D OS.

Extraocular Movements: All extra ocular movements are full and normal

Anterior segment examination of the patient is as follows:

Table 2: Slit Lamp Examination

	Right Eye	Left Eye
LIDS	Normal	Normal
CONJUNCTIVA	Normal	Normal
CORNEA	Clear	Clear
ANTERIOR CHAMBER	Normal depth and quiet	Normal depth and quiet
IRIS	Normal colour and pattern	Normal colour and pattern
PUPIL	3mm, round, regular and reactive	3mm, round, regular and reactive
LENS	Clear	Clear

Intraocular Pressure [Non-Contact Tonometry]:

RIGHT EYE: 14 mm of hg LEFT EYE:12 mm of hg

Dilated Fundoscopy: Both eyes dilated using tropicamide. After full dilation of pupil (8mm):

Table 3: Dilated Fundoscopy

	Right Eye	Left Eye
GLOW	Present	Present
MEDIA	Clear	Clear
DISC	Normal in size and shape, slightly hyperemic, tilted disc with clear margins and healthy neuroretinal rim	Normal in size and shape, slightly hyperemic, tilted disc with clear margins and healthy neuroretinal rim
CDR	0.3	0.3
VESSELS	A:V=1:3	A:V=1:3
BACKGROUND	Multiple cotton wool spots present around the disc & in all quadrants. Few flame shaped hemorrhages present around the disc. Peripheral tessellations present.	Multiple cotton wool spots present around the disc & in all quadrants. Few flame shaped hemorrhages present around the disc. Peripheral tessellations present.
MACULA	Dull foveal reflex with mild elevation	Dull foveal reflex with mild elevation



Right Eye

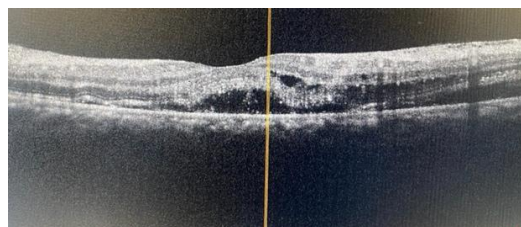


Left Eye

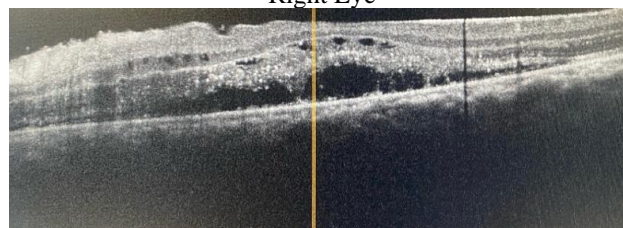
Fig1: Fundus photographs at the time of presentation

According to the above fundus findings, it is diagnosed that the patient is having Grade III Hypertensive Retinopathy, as per Keith-Wagner-Barker Classification.

Optical Coherence Tomography (OCT): OCT of both eyes showed normal vitreoretinal interface. Foveal contour is altered with hypo-reflective spaces in intraretinal layers of macular area and subfoveal space suggestive of macular edema and subretinal fluid respectively and hyper-reflective lesions suggestive of exudates. Choroidal complex appears to be normal.



Right Eye



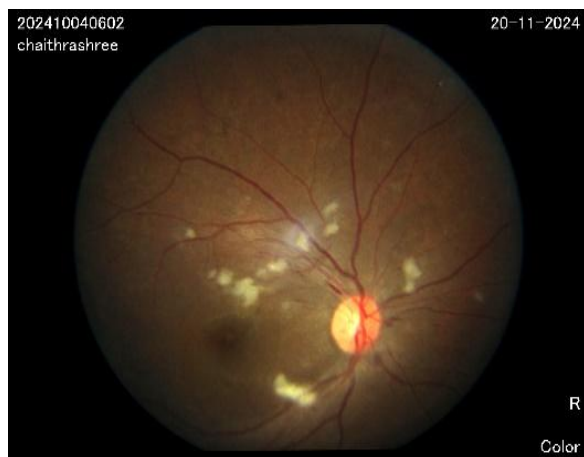
Left Eye

Fig2: OCT images at the time of presentation

Follow Up:

Patient is followed up every day for a week and weekly once thereafter up to six weeks.

- After 2 weeks, it was noted that the blood pressure of the patient was under control. She reported an improvement in the visual acuity. Unaided visual acuity was recorded to be cf@3mt in both eyes. On dilated funduscopy, the patient had fewer cotton wool spots in both eyes as compared to the day of presentation. Macular edema and subretinal fluid showed improvement in subsequent OCT scans.



Right Eye



Left Eye

Fig3: Fundus photographs after 2weeks

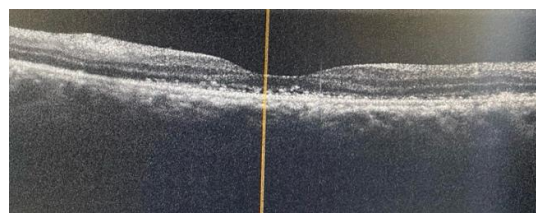
- After a period of 6 weeks, the unaided vision in both eyes is 6/60 and best corrected visual acuity of 6/6 in both eyes. On dilated funduscopy, there was no evidence of hypertensive retinopathy in the patient. OCT changes reverted to normal.



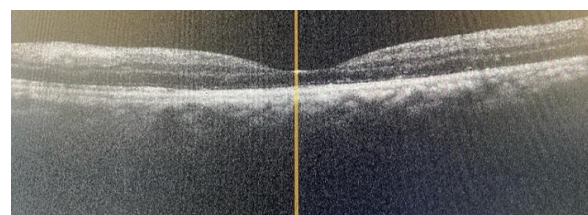
Right Eye



Left Eye

Fig4: Fundus photographs after 6weeks

Right Eye



Left Eye

Fig5: OCT images at 6weeks**3. Discussion**

Hypertensive disorders of pregnancy were classified into pre-eclampsia, eclampsia, gestational hypertension, chronic hypertension and chronic hypertension with superimposed preeclampsia, according to consensus definitions. Preeclampsia/eclampsia associated retinopathy is characterized by retinal arteriolar narrowing due to systemic hypertension and ischemia that may cause damage to the retinal and choroidal vasculature and to the retinal pigmented epithelium (RPE).

Hypertensive retinopathy was determined using Keith-Wagner-Barker classification.

Grade 1: Generalized arteriolar attenuation

Grade 2: Grade 1 with definite focal narrowing and arteriovenous nicking

Grade 3: Grade 2 plus hemorrhages and/or exudates

Grade 4: Optic disc edema with/ without above changes

This ischemic state may commonly manifest as 1) reduced arteriolar caliber and arteriovenous ratio, 2) retinal hemorrhages, 3) retinal edema, 4) cotton wool spots secondary to arteriolar damage, 5) choroidal dysfunction with secondary RPE damage, 6) serous retinal detachment, 7) retinal pigment epitheliopathy, 8) vitreous hemorrhage.

Serous retinal detachment is a rare complication of preeclampsia which is due to choroidal ischemia causing subretinal leakage, the incidence of which is 1% in cases of severe preeclampsia. Conservative management with optimization of blood pressure is the mainstay of treatment.

Routine fundus examination after the diagnosis of preeclampsia is necessary to monitor the well-being of the mother and in turn, the fetus. Close collaboration between obstetricians and ophthalmologists is essential for ensuring optimal maternal and fetal outcomes.

4. Conclusion

In conclusion the level of blood pressure, grade of proteinuria and severity of PIH are correlated with the severity of vascular changes in pregnant women. Routine fundus examination should be performed in women suffering from PIH, so that the status of retinal vasculature in particular and placental vasculature in general can be assessed. Timely diagnosis and management of such patients leads to prevention of significant loss in terms of maternal and fetal morbidity and mortality which adds up to the increased quality of life.

References

- [1] Reddy SC, Nalliah S, George SRA, Who TS. Fundus changes in pregnancy induced hypertension. *Int J Ophthalmol.* 2012 Dec 18;5(6):694–7. doi: 10.3980/j.issn.2222-3959.2012.06.08. PMID: 23410822. PMCID: PMC3530810.
- [2] Errera MH, Kohly RP, da Cruz L. Pregnancy-associated retinal diseases and their management. *Surv Ophthalmol.* 2013 Mar-Apr;58(2):127-42. doi: 10.1016/j.survophthal.2012.08.001. PMID: 23410822.
- [3] Bakhda RN. Ocular manifestations of pregnancy-induced hypertension. *DJO.* 2015;26(2):88–92. doi: 10.7869/djo.144.
- [4] Khanom R, Faridi J, Nur J, et al. Ocular fundus changes in pregnancy induced hypertension. *J Dhaka Med Coll.* 2020;28(1):94–9. doi: 10.3329/jdmc.v28i1.45763.
- [5] Dutta D, Konar H. DC Dutta's textbook of gynecology. In: Dutta DC, editor. *DC Dutta's Textbook of Gynecology.* JP Medical Ltd; 2014. doi: 10.5005/jp/books/12047. Agarwal A, Gass J. Gass'

Atlas of Macular Diseases. Edinburgh: Elsevier Saunders; 2012.

- [6] Ryan S, Sadda S, Hinton D, Schachat A, Wilkinson C, Wiedemann P. *Retina.* 6th ed. Elsevier; 2018.
- [7] Janjua MI, Bano S, Raza A. Retinopathy in pregnancy induced hypertension. *Pak J Ophthalmol.* 2015;31.
- [8] Agarwal A, Gass J. *Gass' Atlas of Macular Diseases.* Edinburgh: Elsevier Saunders; 2012.
- [9] Modi P, Arsiwalla T. Hypertensive retinopathy. [Updated 2023 Jul 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK525980/>
- [10] Phang DSK, Ariffin N, Abd Aziz H, Vendargon FM, Sonny Teo KS. Bilateral Serous Retinal Detachment in Pregnancy. *Cureus.* 2022 Oct 7;14(10):e30019. doi: 10.7759/cureus.30019. PMID: 36348857; PMCID: PMC9637277.