



## DENGUE FEVER: FUNDOSCOPIIC FINDINGS

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## ABSTRACT

**Purpose** - To study the fundoscopic findings in patients of dengue fever. **Methods**- This was a prospective observational study that involved 50 eyes of 25 patients with dengue fever complaining of diminution of vision. Complete ophthalmic examination was done in diffuse light followed by direct and indirect ophthalmoscopic examination. **Results**-There were 16 males and 9 females . Most of the patients presented with diminution of vision followed by scotoma , pain , redness, metamorphopsia and micropsia. Ocular findings were mostly seen in the posterior pole of the fundus, manifesting as retinal hemorrhages (88%), macular edema(64%), foveolitis(58%), vasculitis (43%), and optic neuropathy (32%). Most patients with dengue-related ophthalmic complications recover spontaneously without any treatment. **Conclusion**- Blurring of vision was the most common presenting symptom followed by scotoma in patients of dengue fever. Ophthalmic complications are usually seen in young adults who often present at the peak of thrombocytopenia. Fundus findings in patients of dengue fever include retinal hemorrhages like flame shaped haemorrhage, dot blot haemorrhage and splinter haemorrhage, macular edema, foveolitis, vasculitis, and optic neuropathy. Almost all patients of dengue had showed improvement in visual acuity and complete resolution of dengue related ophthalmic complications.

**KEYWORDS** : Dengue Fever, Blurring of Vision, Haemorrhage, Vasculitis.

## INTRODUCTION

Dengue fever is a mosquito borne disease that is commonly found in the tropics<sup>[1]</sup>. Dengue virus belongs to the *Flavivirus* genus of the family, *Flaviviridae*, and its members include the four antigenically-related serotypes of dengue virus (DENV 1-4). It is transmitted to humans by the bite of an infected female *Aedes* mosquito, usually the *Aedes aegypti* mosquito.

Dengue infection is characterized by an acute onset of fever associated with symptoms of malaise, sore throat, rhinitis and cough, headache, muscle ache, retro-orbital pain, joint pain, abdominal discomfort, and rash<sup>[1]</sup>. Other clinical manifestations of dengue are related to the bleeding diathesis from thrombocytopenia. Dengue infection is usually a clinical diagnosis but can be confirmed with laboratory tests based on the time of presentation; frequently used tests include polymerase chain reaction (PCR), and immunoglobulin M (IgM) or immunoglobulin G (IgG) enzyme immunoassays<sup>[1]</sup>

Dengue is usually a self-limiting infection. Recovery from infection with one serotype provides lifelong immunity against that serotype, but confers only transient and partial immunity against subsequent infection by other serotypes<sup>[2]</sup>. Sequential infections with other serotypes may increase the risk of more serious systemic disease, such as dengue hemorrhagic fever or dengue shock syndrome, which are life-threatening<sup>[2]</sup>.

Since the beginning of the new millennium, there have been an increasing number of reports describing a myriad of ocular signs and symptoms associated with dengue fever<sup>[3-9]</sup>. The precise pathophysiologic mechanism of dengue ophthalmic complications is not well understood; however, many studies have alluded to the possibility of an immune-mediated process as a likely mechanism<sup>[8-10]</sup>

Ocular symptoms in patients of dengue fever include blurring of Vision being most common feature followed by central scotoma. The areas of scotoma corresponded to the areas of edema and hemorrhage in the macula. Some patients presented with ocular pain with location of pain described as retrobulbar in most of the cases followed by diffuse pain in few

patients. The patients with retrobulbar pain consisted of those who presented with subconjunctival hemorrhage and retinopathy sparing the macula, stellar neuroretinitis, and retinal hemorrhages .

Other Symptoms include metamorphopsia and micropsia in few patients. Impairment of color vision had been reported in patients with optic neuropathy and maculopathy. Floaters were less common. Redness was the least common symptom .

**Anterior segment signs**- Subconjunctival Hemorrhage was seen in majority of cases. Dengue-related subconjunctival hemorrhage presented with petechial hemorrhages present in the conjunctivae and some patients had diffuse hemorrhages noted in one to four quadrants. Patients with dengue infection rarely presented with uveitis leading to redness of eyes. Other anterior segment signs include shallow anterior chamber. The intraocular pressure was normal in the patient with bilateral choroidal effusions but was elevated in the other patient with angle closure glaucoma. Ciliary congestion was noted in few patients with uveitis.



**Figure 1:** Showing Sub conjunctival Haemorrhage due to dengue

**Posterior segment signs**- Hemorrhages associated with dengue-related maculopathy are mostly intraretinal and can take the form of dot, blot, or flame-shaped hemorrhages in association with venous sheathing . Dengue-related foveolitis refers to the yellow-orange lesion at the fovea of patients with dengue maculopathy, which corresponds to a disruption of the outer neurosensory retina in optical coherence tomography (OCT). Dengue-related maculopathy commonly presents with macular edema<sup>[8]</sup>. The three patterns of macular edema on

OCT include type 1, which is diffuse edema, type 2, which is cystoid edema, and type 3, which is cystic foveolitis. There are also isolated case reports of patients with dengue-related macular edema. Optic disc swelling, hyperemia, and disc hemorrhages are common presentations of dengue-related optic neuropathy.

Other less common dengue-related ocular signs include vitreous hemorrhage, vascular occlusion mainly consisted of vein occlusions and in some patients arterial occlusion of the superotemporal macular branch.

**MATERIALS AND METHODS**

This was a prospective observational study that involved 50 eyes of 25 patients with dengue fever complaining of diminution of vision. Patients were recruited from the OPD of MLB MEDICAL college, Jhansi, Uttar Pradesh and were followed from 1<sup>st</sup> July 2021 - 1<sup>st</sup> December 2021. It was performed under the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

**Inclusion Criteria**

1. All patients who presented to the OPD of MLB medical College Jhansi with the complaint of diminution of vision and diagnosed case of dengue fever were included.

**Exclusion Criteria**

1. Patients with ocular systemic diseases (like hypertension, diabetes) that could affect the retina.
2. Patients with other retinal disorders
3. Patients with recent intraocular surgery.
4. Patients with the history of trauma
5. Patients with dense cataract
6. Mentally or physically unfit patients

All patients were subjected to a detailed history taking, refraction using Topcon autorefractometer and best corrected visual acuity (VA) measurement. All patients had complete ophthalmic examination including biomicroscopic slit lamp examination, fundus examination with 90D lens and fundus photography and optical coherence tomography.

Optical coherence tomography examination was done through dilated pupils, OCT examination was done through a dilated pupil using commercially available Cirrus HD-OCT Model 4000 - Carl Zeiss Meditec, Inc., Dublin, California, USA or Spectralis OCT Heidelberg Engineering.

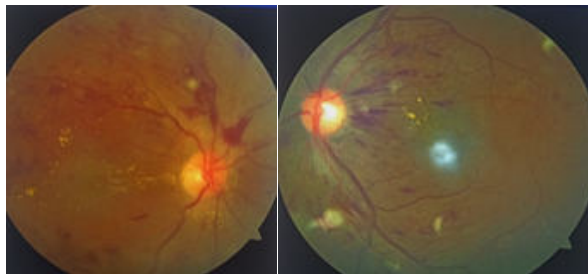
**RESULT:**

A total of 50 eyes of 25 patients were studied. We included eyes with complaint of diminution of vision. There were 16 males and 9 females and 60% of the studied eyes were the right eyes.

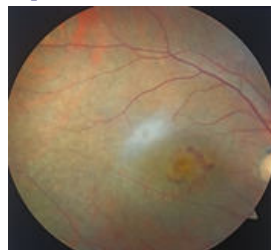
All eyes had one or more features typical of dengue related retinopathy (like include retinal hemorrhages like flame shaped haemorrhage, dot blot haemorrhage and splinter haemorrhage, macular edema, foveolitis, vasculitis, and optic neuropathy)

**Table 1: Ophthalmoscopic findings in patients of dengue fever**

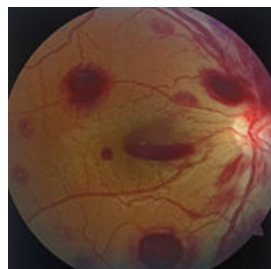
| Variables                  | Number of patients |
|----------------------------|--------------------|
| • Retinal haemorrhage      | 88                 |
| • Flame shaped haemorrhage | 42                 |
| • Dot blot haemorrhage     | 36                 |
| • Splinter haemorrhage     | 10                 |
| • Macular edema            | 64                 |
| • Foveolitis               | 58                 |
| • Vasculitis               | 43                 |
| • Optic neuropathy         | 32                 |



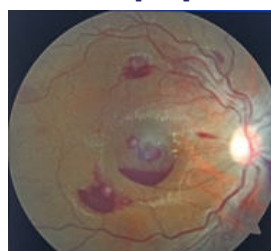
**Figure 2 A and B: Showing multiple dot blot and flame shaped haemorrhages and exudates, seen in dengue related retinopathy**



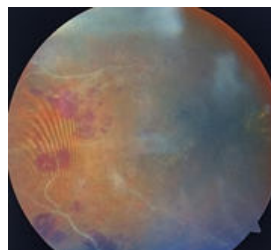
**Figure 3: Showing dengue related foveolitis**



**Figure 4: Showing multiple types of retinal, preretinal and subhyaloid haemorrhages along with optic neuropathy seen in dengue related retinopathy**



**Figure 5: Showing multiple retinal haemorrhages and macular edema seen in dengue related retinopathy**



**Figure 6: Showing Roth spots, multiple retinal haemorrhages and vasculitis seen in dengue related retinopathy**

**DISCUSSION**

Chlebicki et al<sup>[8]</sup> showed M:F as 1:3 ratio presenting with blurring of vision (100%), visual acuity reduced (100%) and metamorphopsia (25%) and dot blot haemorrhages within the vascular arcades in both the eyes (100%) of patients. Preechawat et al<sup>[11]</sup> concluded flame shaped haemorrhages at fovea and mild bilateral optic disc hyperemia. FFA showed no disc leakage and bilateral cecocentral scotomas. Habot

Wilner et al<sup>[12]</sup> showed visual acuity 6/6 in both eyes with eyelid edema, conjunctival irritation, scotoma in central visual field. Vitreous cells, retinal infiltrate with central dot haemorrhages and microhaemorrhages near fovea and macular edema was seen. Chan et al<sup>[8]</sup> in his study saw that M:F ratio presenting with anterior uveitis(7.7%), retinal vasculitis (30.8%), exudative retinal detachment (15.4%), maculae edema (76.9%), blot haemorrhages at macula (69.2%), perifoveal telangiectasia and CWS(7.7%). Investigation revealed FFA: extensive fluid leakage from retinal vessels (30.8%). HVF and Amsler Chart showed central scotomas (100%). Lim et al<sup>[4]</sup> in his study concluded that M:F 1:5 ratio with AC cells(18.2%), vitreous cells(18.2%), RPE changes (27.3%), RPE discoloration (9.1%), retinal haemorrhages (36.4%), retinal vasculitis (9.1%), intraretinal white lesions (18.2%) and macular edema (54.5%). FFA showed arteriolar focal knobby hyperfluorescence in the macular area with mild vascular wall staining and leakage and early hyperfluorescent spots at the level of the RPE and diffuse choroidal hyperfluorescence. Garcia et al<sup>[13]</sup> in his case report had a patient with dengue related retinopathy presenting with retrobulbar pain and vitritis in both eyes, macular star, exudates, optic disc swelling, optic disc haemorrhages, papillitis with areas of serous detachment in the posterior pole and vascular arcades in both eyes. Teoh et al<sup>[14]</sup> in his study concluded blurring of vision(60%), visual acuity range from 6/6 to CF, central scotoma(30%), metamorphopsia (4%) visual field defect (2%), floaters (6%), near visual disturbances (6%) and redness(2%) in patients. Bacsal et al.<sup>[9]</sup> in his case series concluded M:F 17:24 ratio and features include AC cells (17%), vitreous cells (31%), both anterior and vitreous cells (11%), vitreous hemorrhage (1%), RPE mottling (17%), intraretinal precipitates (1%), yellow subretinal dots (28%), arteriolar sheathing (4%), venular sheathing (45%), retinal hemorrhage (45%), optic disc hyperemia (14%), optic disc edema (11%) and foveal swelling (15%).

## CONCLUSIONS

The pathological process of dengue ophthalmic complications is complex and clinical manifestations varied. Ophthalmic complications are usually seen in young adults who often present at the nadir of thrombocytopenia. Despite good recovery of vision and resolution of clinical signs in most patients, ophthalmologists and physicians should be aware and vigilant as isolated reports of cases of dengue ophthalmic complications with poor visual acuity refractory to treatment have been reported. Blurring of vision was the most common presenting symptom followed by scotoma. Ocular findings were mostly seen in the posterior pole of the fundus, manifesting as retinal hemorrhages, macular edema, foveolitis, vasculitis, and optic neuropathy. Most patients with dengue-related ophthalmic complications recover spontaneously without any treatment. Patients with severe visual loss or bilateral involvement were treated with systemic steroids and occasionally immunoglobulins. Prognosis of dengue-related ophthalmic complications is favorable; almost all patients had normal or showed improvement in visual acuity and complete resolution of dengue ophthalmic complications is seen in most of the patients.

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