

Ocular manifestations of dengue fever

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Abstract

Background: Dengue fever, borne by *Aedes aegypti* mosquito, is one of the most common and most prevalent forms of flavivirus infections in humans, endemic in tropics and warm temperate regions of the world. We report a spectrum of ocular manifestations of dengue fever along with its associated laboratory findings.

Objective: To study the ocular manifestations associated with dengue fever.

Materials and Methods: This study was conducted in 120 patients hospitalized with diagnosis of dengue fever over a period of 6 months from April 2014 to September 2014. All patients underwent complete evaluation with respect to systemic examination, ophthalmic examination in Department of Ophthalmology, Dr. BR Ambedkar Medical College and Hospital, Bengaluru, Karnataka, India.

Result: A total of 120 patients were diagnosed with dengue fever; of which, 75 (62.5%) were men and 45 (37.5%) were women. Mean age was 32 years (20–60 years). Only 39 patients (32.7%) had complaints of retrobulbar pain in the eyes. Two patients (1.67%) had blurring of vision. Ocular findings were present in 68 patients (56.7%). Most common anterior segment findings were subconjunctival hemorrhage in 55 patients (45.8%). Posterior segment findings were present in 16 patients (13.3%); of which, 14 (87.5%) had retinal hemorrhages. Ocular changes had resolved in all the cases, which came for follow-up in 8–10 weeks. It was mostly attributed to the improving platelet count.

Conclusion: The incidence of ocular complications in dengue fever is increasing, hence all patients with dengue should be referred to an ophthalmologist to prevent any sight-threatening complications.

KEY WORDS: Dengue fever, ocular manifestations, subconjunctival hemorrhages

Introduction

Dengue fever is the most common viral disease of the humans, transmitted by bite of infected female *Aedes aegypti* mosquito. The highest incidence occurs in Southeast Asia and the American tropics. Worldwide cases of illness exceed 50–100 million per year.^[1]

Dengue infection is characterized by an abrupt onset of fever along with symptoms of malaise, sore throat, rhinitis and cough, headache, muscle ache, retro-orbital pain, lumbosacral

pain, and rash. Other clinical manifestations of dengue are related to the bleeding diathesis from thrombocytopenia.^[2]

Ophthalmic manifestations in dengue fever were previously not well described but now can be seen with increasing frequency in recent literature.^[3–9] The main ocular manifestations included conjunctival hemorrhages, macular edema, and retinal hemorrhages. Less common features included exudative retinal detachment, anterior uveitis, periphlebitis, branch retinal vein occlusion, and vitreous hemorrhage. A majority of patients were reported to have residual visual impairment secondary to maculopathy and optic neuropathy.^[5,6] The main objective of this study was to evaluate the ophthalmic manifestations associated with dengue fever.

Materials and Methods

A prospective observational study was conducted in 120 patients in Department of Ophthalmology, Dr. BR Ambedkar

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Medical College and Hospital, Bengaluru, Karnataka, India, who were hospitalized for dengue fever. The diagnosis was based on presence of fever with other characteristic symptoms and signs. It was confirmed with serological testing with IgM and IgG antibody assay and decreasing platelet counts. The study was carried out for a period of 6 months from April 2014 to September 2014. All patients were asked detailed history with importance to visual symptoms. Detailed systemic examination and laboratory findings were recorded. All patients' best-corrected visual acuities were measured with Snellen acuity chart for both distance and near. Further, they were evaluated in detail with slit lamp examination using +90 D lens, +78 D lens. Dilated fundus examination was carried out with indirect ophthalmoscope using +20 D lens, and fundus photos were taken with fundus camera. The patients with positive ophthalmic findings were asked to follow-up weekly.

Result

Of the 120 patients diagnosed with dengue, 75 (62.5%) were men and 45 (37.5%) were women [Figure 1] with mean age of 32 years (20–60 years) [Figure 2]. All patients presented with fever, with 110 (92%) patients presenting with myalgia. Other uncommon systemic findings were vomiting, lumbosacral pain, and bleeding gums. Retrobulbar pain was present in 39 (32.5%) patients and 104 (87%) patients were found to have marked thrombocytopenia $<50,000/\mu\text{l}$. Ocular manifestations were seen in patients with thrombocytopenia $<35,000/\mu\text{l}$ [Figure 3] with maximum in range between 15,000/ μl and 35,000/ μl .

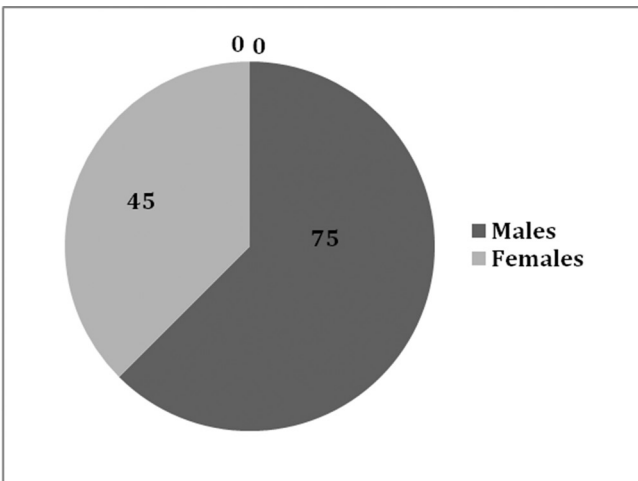


Figure 1: Gender distribution.

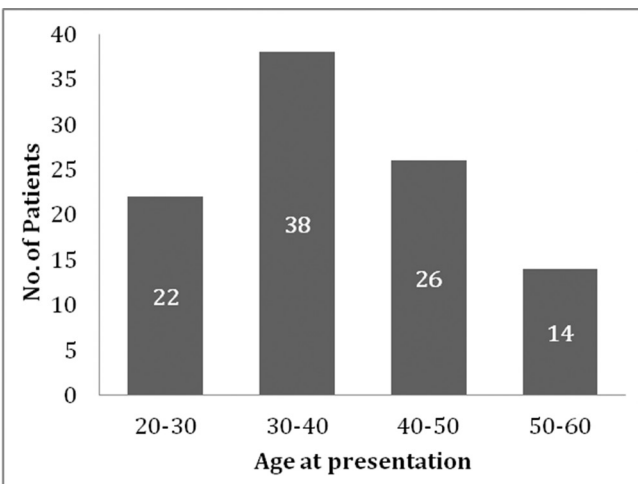


Figure 2: Age-wise distribution.

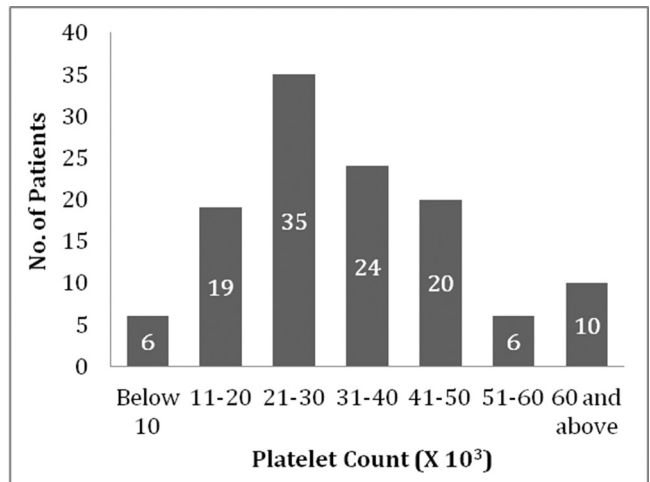


Figure 3: Platelet count.

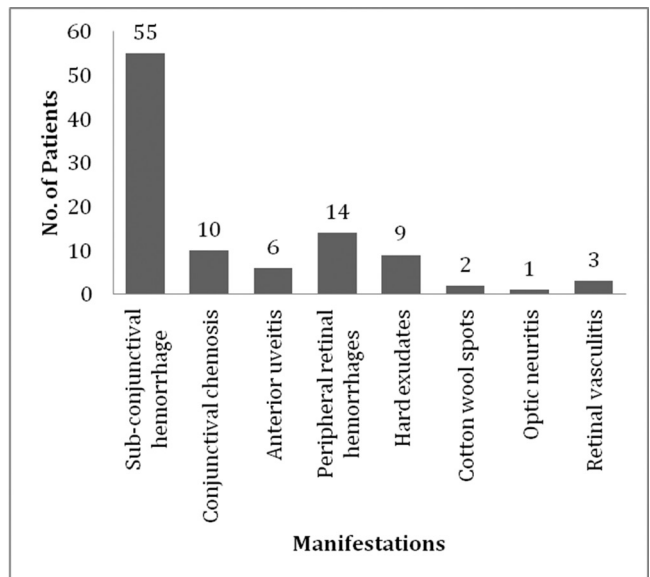


Figure 4: Ocular manifestations.



Figure 5: Subconjunctival hemorrhage in right eye of a 24-year-old female diagnosed with dengue fever.

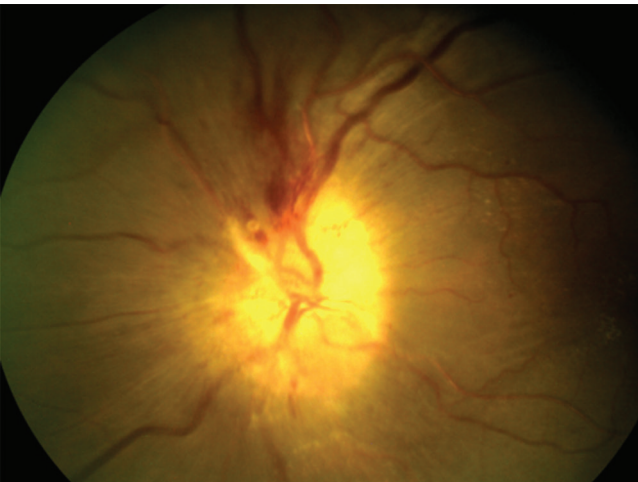


Figure 6: Fundus photo of left eye showing disk swelling, hyperemia, and hemorrhages suggesting dengue-related optic neuropathy in a patient diagnosed with dengue fever.

The mean time interval of presentation of ocular features was eighth day with range of 5–11 days. Ocular findings were present in 68 patients; of which, 55 (45.8%) [Figure 5] had subconjunctival hemorrhage as the most common anterior segment findings. Of the 55 patients, 40 had petechial type and rest diffuse type of hemorrhage.

Other uncommon anterior segment findings were conjunctival chemosis and anterior uveitis. Posterior segment findings were present in 16 patients (13.3%), of which 14 (87.5%) had peripheral retinal hemorrhages. Other uncommon findings were retinal vasculitis, cotton wool spots, and hard exudates. Only one patient had optic neuritis [Figure 6].

Of the 68 patients having ocular manifestations [Figure 4], 60 patients who could be followed up had completely resolved

ocular findings within 8–10 weeks. It was mainly attributed to the improving platelet counts.

Discussion

Dengue is one of the most important emerging viral diseases affecting the humans, especially in Southeast Asian countries posing a public health problem.^[10] It is a communicable disease transmitted by the bite of an *Aedes* mosquito infected with any one of the four dengue viruses (DEN-1, DEN-2, DEN-3, and DEN-4). Recovery from infection by one provides lifelong immunity against that particular serotype. Subsequent infections by other serotypes increase the risk of developing severe dengue (previously known as dengue hemorrhagic fever).^[1]

The mechanism of the varied ophthalmic manifestation of dengue fever ranging from subconjunctival hemorrhage to optic neuritis is not well known but indicative of an immune mediated process and possibly infective etiology.^[11] The causes of hemorrhage could be thrombocytopenia with coagulation defects, capillary fragility, consumptive coagulopathy, and platelet dysfunction.^[12] Generally, there is complete resolution of ocular changes in dengue fever.

Ocular manifestations reported to be associated with dengue infection are mostly posterior segment, such as macular edema, vascular occlusion, vitreous hemorrhage, optic neuropathy, chorioretinitis, vasculitis with retinal hemorrhages, and cotton wool spots.^[4,5,8,13,14] Anterior segment manifestation has been mostly reported in the form of subconjunctival hemorrhages and anterior uveitis.^[15,16] Other very rare associations are ptosis and periorbital ecchymosis and globe rupture.^[3,17,18]

Our study is similar to that by Kapoor *et al.*^[15] and Hussain *et al.*^[3] with regard to male preponderance. The mean age group of our study is 32 years that is also similar in other studies.^[3,15]

A total of 87% of our patients had platelet count $<50,000/\mu\text{l}$ and all our patients with ocular complications had platelet count of $<35,000/\mu\text{l}$ as compared to the study reported by Kapoor *et al.*,^[15] which had 90.7% of similar association. The onset of ocular manifestations in our study correlated with the nadir of thrombocytopenia as seen in other studies.^[3,9,13,18]

The most common ocular manifestation in our patients was subconjunctival hemorrhage followed by retinal hemorrhages. It was similar to the studies by Kapoor *et al.*^[15] and Hussain *et al.*^[3] however, in contrast, one patient presented with optic neuropathy in our study.

Less common findings were anterior uveitis and conjunctival chemosis, hard exudates, cotton wool spots, and retinal vasculitis. In our study, the ocular findings were varied involving both anterior and posterior segments in contrast to study reported by Lim *et al.*^[8] wherein the ocular features were mainly limited to the macula.

None of the patients in our study presented with bilateral periorbital ecchymosis or unilateral ptosis and proptosis, secondary to anterior orbital and retrobulbar hemorrhage,

respectively, or globe rupture as compared to other previously reported studies.^[3,15]

The patients in our study even included patients with diabetes and hypertension, so the retinal manifestations per se could not be attributed to dengue fever, but just as an association with dengue fever that forms a limitation to our study.

Because there is expected increase in epidemicity of dengue fever, hence even the ophthalmic manifestations are expected to rise, so the treating physician should be aware and promptly refer any such case to the ophthalmologist as early as possible.

Conclusion

Dengue fever can result in varied ocular manifestations ranging from subconjunctival hemorrhage to optic neuropathy. Though most common manifestation is subconjunctival hemorrhage, retinal hemorrhages can also occur. Hence, thrombocytopenia should be corrected at the earliest to avoid ocular complications.

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