

Original research article

Sight Threatening Ocular Complications in Dengue fever

-A Prospective Study

Dr.S.Padmanaban¹, *Dr.C.Jeevakala², Dr.J.Saravanan³, Dr.G.Shalini⁴

¹ Professor and Head of the Department, Ophthalmology, Coimbatore Medical College, TN, India

² Assistant Professor, Ophthalmology, Coimbatore Medical College, TN, India

³ Associate Professor, Ophthalmology, Coimbatore Medical College, TN, India

⁴ Junior Resident, Ophthalmology, Coimbatore Medical College, TN, India

Corresponding author *

Abstract:

Aim: To report cases of sight threatening ophthalmic complications observed during dengue epidemic in 2017 at a tertiary health center in Tamil Nadu.

Settings and Design: Tertiary Care Referral Center in Tamil Nadu. Prospective, single institution, Observational case-series.

Methods: Five patients with dengue fever with grave ophthalmic complications seen in fever intensive care ward in our center during the period of dengue epidemic in 2017 were included.

Results: Out of 3338 dengue positive cases reported in our center from June-2017 to December-2017, five cases presented with grave eye findings with loss of vision / loss of the eye in due course. All presented with a short history of fever with thrombocytopenia, with ocular manifestations namely 1.Retro-bulbar hemorrhage with hyphema-ended with globe luxation, 2.Suprachoroidal hemorrhage with globe rupture, 3.Endogenous Endophthalmitis with ring abscess going for Panophthalmitis, 4.Premacular hemorrhage resolved with some improvement in vision after hyaloidotomy, 5.Massive suprachoroidal hemorrhage.

Conclusion: Dengue hemorrhagic fever itself is a dreadful and sometimes fatal disease, in which we encountered few patients with very rare and severe ocular manifestations during the dengue epidemic in our hospital in 2017. Some of these complications have not been reported so far.

Keywords: Dengue epidemic, dengue eye complications, dengue fever, globe rupture, luxated globe, thrombocytopenia.

INTRODUCTION

Dengue fever is a mosquito-borne tropical disease caused by the dengue virus^[1]. It is an RNA virus of the family Flaviviridae, genus Flavivirus. The virus has four different types, where infection with one type usually gives lifelong immunity to that type, but a short-term immunity to the other types. Subsequently infection with a different type increases the risk of severe complications. Dengue is spread by the bite of several fresh water breeding species of mosquito of the Aedes type, principally A. Aegypti^[1].

Dengue fever usually presents with an acute onset of fever associated with malaise, rhinitis, sore throat and cough, headache, muscle ache, retro-bulbar pain, joint pain, abdominal discomfort and rash^[1,3]. Other clinical features of dengue are bleeding manifestations attributed to thrombocytopenia. Dengue fever is confirmed with laboratory tests based on the duration of presentation; polymerase chain reaction

(PCR) is the frequently used test during the early phase of the infection, when fever is within 5 days. If fever exceeds 5 days, the preferred tests are dengue IgM and IgG tests [2].

Dengue is a self-limiting infection. But sequential infections with other serotypes may increase the risk of serious systemic disease, such as dengue hemorrhagic fever or dengue shock syndrome, which are life-threatening^[3,4]. Herein we report few grave ocular manifestations associated with dengue infection. The precise pathophysiologic mechanism of dengue ocular complications is not yet well understood^[5]; however, many studies have alluded to the possibility of an immune-mediated process as a likely mechanism^[6].

Materials and methods

This study is a prospective review of five consecutive sight threatening ocular complications observed during the dengue epidemic period, June-2017 to December-2017 in a tertiary institute in Tamil nadu. Out of 5652 blood samples collected from patients with fever with thrombocytopenia, 3338 were diagnosed with dengue infection by dengue IgM ELISA and NS1 antigen tests. Among them five patients presented with serious ocular manifestations which are reported here.

Case 2.1: Retrobulbar hemorrhage with globe luxation:A 23 years old male presented with fever with cough and loose stools for 5 days and was found to have thrombocytopenia. His dengue IgM was positive. He developed pain Left eye on 6th day, with severe deterioration of vision. On examination patient's general condition was found to be very poor and ocular examination showed vision in Right eye-6/6, Left eye-no perception of light. Right eye-anterior and posterior segment were normal, Left eye was proptosed and the globe luxated outside the palpebral aperture, lids were edematous and retracted, hemorrhagic chemosis present with dry and lustreless cornea. Further details not visualized due to hyphema in anterior chamber. All extraocular movements were restricted [Fig.1]. Intra-ocular pressure in left eye was digitally elevated. Day-by-day his symptoms worsened. MRI brain and orbit was reported as vitreous hemorrhage and subretinal hemorrhage and retinal detachment with Retrobulbar hemorrhage and temporal fossa hematoma [Fig.2].



Figures 1 and 2: Patient with luxated globe Left eye with temporal fossa hematoma.

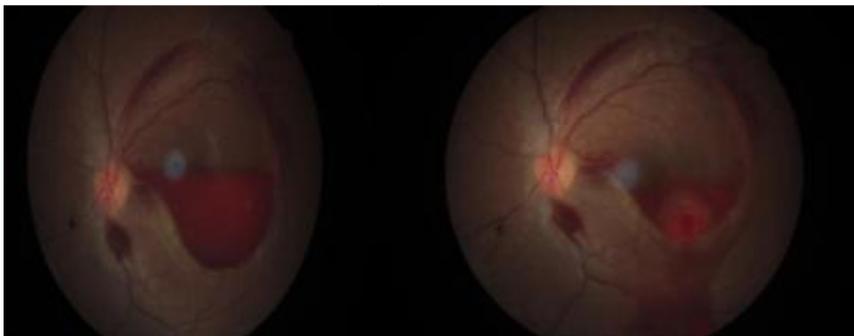
Case 2.2: Suprachoroidal hemorrhage with globe rupture:A 75 years old female patient with history of fever for 2 days with thrombocytopenia was admitted in fever intensive care ward. Dengue NS1Ag

was positive. Patient had complaints of defective vision and pain in Left eye. On examination of Left eye vision was perception of light, mild lid edema, chemosis, mild shallow anterior chamber, pupil-3 mm, sluggishly reacting to light with hazy fundus view. Intra-ocular tension raised digitally [Fig.3]. Next day patient's vision in Left eye further deteriorated to no perception of light and anterior chamber was very shallow. Clinically diagnosed as suprachoroidal hemorrhage, which was confirmed by B-scan. During the early hours of next morning, patient had excruciating pain with excessive bleeding from the Left eye. Immediate examination revealed rupture of the globe Left eye [Fig.4].



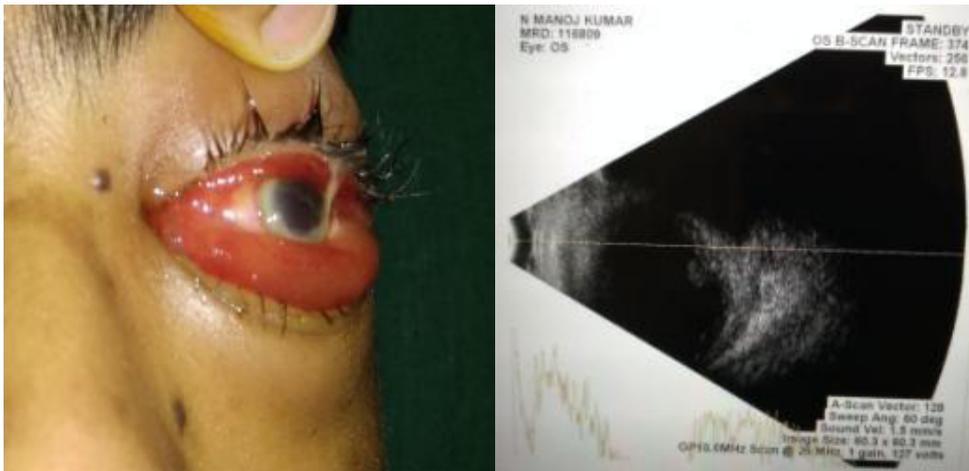
Figures 3 and 4:(3) Left eye with chemosis on day 1 (4) Left eye globe rupture at the limbus {white arrow} with prolapse of uveal tissue and vitreous on day 2.

Case 2.3: Sub-hyaloid premacular hemorrhage: A 23 years old male presented with fever for 10 days with thrombocytopenia and dengue IgM was positive. Patient developed painless defective vision in both eyes over the last 5 days. On examination, vision in Right eye was 6/36, Left eye was 3/60 with mild conjunctival congestion, anterior chamber was mild shallow with 3 mm pupil, reacting to light. Fundus of both eye showed sub-hyaloid premacular hemorrhage [Fig.5]. Nd:Yag laser hyaloidotomy was performed in each eye[Fig.6]. Later patient's vision improved to 6/9 in each eye.



Figures 5 and 6:(5) Left eye premacular subhyaloid hemorrhage (6) Left eye hemorrhage draining after hyaloidotomy.

Case 2.4: Endogenous Endophthalmitis: A 25 years old male admitted in fever ward with complaints of fever for 6 days with thrombocytopenia. Dengue IgM was positive. Patient developed painful loss of vision in Left eye with history of vomiting. On examination patient was toxic, vision in Left eye was no projection of light, mild lid edema with hemorrhagic chemosis and ring abscess in the cornea with keratic precipitates over back of the cornea, anterior chamber showing flare and cells and other details could not be made out [Fig.7]. Extra-ocular movements were painful and restricted. B-scan Left eye revealed thickening of sclero-choroidoretinal complex and few echoes in the vitreous cavity suggestive of Endogenous Endophthalmitis going to Panophthalmitis [Fig.8]. Grave visual prognosis was explained to the patient and patient was lost for further follow-up.



Figures 7 and 8: (7) Left eye with hemorrhagic chemosis with corneal ring abscess (8) B-scan of Left eye showing sclero-choroidoretinal complex thickening with echoes in vitreous.

Case 2.5 : Massive suprachoroidal hemorrhage : A 23 years old male referred from secondary center as fever for 5 days with thrombocytopenia admitted in intensive care unit. Dengue NS1Ag was positive. Patient's general condition was very poor. On examination patient was unconscious. Right eye showed mild hazy cornea and shallow anterior chamber with relative afferent pupillary defect and intra-ocular pressure was raised (27.3 mmHg by Schiottz tonometer) [Fig.9]. Left eye anterior segment was normal with fundus showing a Roth spot. When we reviewed the case 6 hours later, Right eye showed worsening of all signs viz. lid edema with ecchymosis, hemorrhagic chemosis, cornea became very hazy with Descemet's folds, more shallowing of anterior chamber and pupil now 3 mm and non-reacting to light [Fig.10]. A clinical diagnosis of massive suprachoroidal hemorrhage was made. CT-Brain showed right intracerebral hemorrhage with fronto-parietal edema. Patient deteriorated and declared dead after 1 hour the same day.



Figures 9 and 10: (9) Right eye with mild hazy cornea and shallow anterior chamber (10) Right eye with hemorrhagic chemosis.

Results

Out of five patients observed 4 were male and 1 was a female patient. Left eye alone was affected in 3 patients and both eyes were affected in 2 patients with left eye affected more than right eye. All had a short history of fever with thrombocytopenia, ranging from 3 to 10 days duration and got treated in fever intensive care unit specifically created for treatment of fever cases during the dengue epidemic. The diagnosis of dengue fever was confirmed by dengue IgM and NS1Ag. Predominant eye symptom was defective vision with or without eye pain presented after 5 days of onset of dengue hemorrhagic fever. All five Ophthalmic manifestations were sight threatening. These ocular presentations often correspond to the nadir of thrombocytopenia. Two patients developed suprachoroidal hemorrhage, resulted with rupture globe in the one who survived the course of the disease. One patient developed Retrobulbar hemorrhage with luxated globe. Another patient developed Endogenous Endophthalmitis going to Panophthalmitis. The last patient had premacular subhyaloid hemorrhage which was intervened at right time and the vision was restored.

Discussion

Dengue fever is endemic in tropical countries which is classified by WHO as neglected tropical disease (NTDs)^[7]. It can manifest as simple **dengue fever** which is self-limiting and recovers in two-seven days. In a small proportion of cases, due to subsequent infection by other subtypes, the disease develops into a life-threatening **dengue hemorrhagic fever** with low blood platelets levels with bleeding manifestations and blood plasma leakage or into **dengue shock syndrome** where dangerously low blood pressure occurs^[4]. The infection typically affects young immunocompetent adults, who often present at the nadir of thrombocytopenia with a myriad of ocular complications relate to dengue infection like sub-conjunctival hemorrhage, uveitis, shallow anterior chamber due to choroidal effusion or angle closure glaucoma, intra-retinal hemorrhages, dengue-related maculopathy, optic neuropathy, vitreous hemorrhage, vascular occlusions^[8]. Endogenous Endophthalmitis^[9] and Panophthalmitis^[10,11] rarely documented. The mechanism behind dengue infection and ocular involvement is unknown, but related to an immune-mediated process and possibly associated with dengue serotyping. Till now the prognosis for the Ophthalmic complications in documented literature is reported to be good with resolution of ocular signs and improved visual acuity in most patients without treatment following dengue infection^[5] with

occasional reports of Endogenous Endophthalmitis^[5,9]. So the authors here propose to create awareness regarding the possibility of few rare sight threatening complications in patients with dengue fever with thrombocytopenia.

Conclusion

Physicians are aware that dengue fever with thrombocytopenia may be fatal in some patients and the risk is explained to the patient and the attendant. Rarely as shown in few of the above instances there may be loss of vision or the eye. In some cases visual recovery may occur. Ophthalmologist and physician should be aware and vigilant towards the patient with dengue-related ophthalmic symptoms as a small proportion of patients of dengue fever with thrombocytopenia may have poor visual outcome refractory to the treatment, the possibility of which should be informed to the patient and their attendant during the course of the treatment. Moreover the study also highlights occurrence of globe luxation and ruptured globe in dengue fever and thrombocytopenia which have not been documented so far for the best of our knowledge.

Acknowledgements

We would like to thank Dr.R.Manohari, Associate professor and incharge of fever intensive care unit, Department of Medicine, Coimbatore Medical College, Coimbatore, Tamil Nadu, for her co-operation and guidance. Also we are very thankful to Dr.N.Mythily, Professor and Head of the Department, Department of Microbiology, Coimbatore Medical College, Coimbatore, Tamil Nadu, for providing dengue statistics.

References

- [1]. World Health Organization. Dengue and dengue hemorrhagic fever-Fact sheet.2009. Available at <http://www.who.int/csr/disease/dengue/en>. Accessed 19 May 2011.
- [2]. Barkham TM, Chung YK, Tang KF, Ooi EE. The performance of RT-PCR compared with a rapid serological assay for acute dengue fever in a diagnostic laboratory. *Trans R Soc Trop Med Hyg.* 2006;100:142-148. doi:10.1016/j.trstmh.2005.05.015.
- [3]. Kularatne SA (September 2015). "Dengue fever". *BMJ.*351:h4661.
- [4]. Gubler DJ. Dengue and dengue hemorrhagic fever. *Clin Microbiol Rev.*1998;11:480-496.
- [5]. Haritoglou C, Dotse SD, Rudolph G, Stephan CM, Thurau SR, Klauss V. A tourist with dengue fever and visual loss. *Lancet* 2002;360:1070.
- [6]. Bascal KE, Chee SP, Cheng CL, Flores JV. Dengue-associated maculopathy. *Arch Ophthalmol* 2007;125:501-10.
- [7]. "CDC - Neglected Tropical Diseases - diseases".www.cdc.gov. Retrieved 2016-10-30.
- [8]. Vivien Cherng-Hui Yip, Srinivasan Sanjay and Tan Tong Koh. Ophthalmic Complication of dengue fever: a systemic review. *Ophthalmol Ther.* 2012 Dec;1(1):2
- [9]. Dr.Shivanand Bubanale, B11613, Dr.Bubanale SC, Dr.Shreya Raikar, Dr.A.Vidhyadhar, Dr.M.Bharadwaj. FP110: Endophthalmitis in dengue fever: a case report. *AIOC* 2017 Jaipur.
- [10]. Saranappa SB, Sowbhagya HN. Panophthalmitis in dengue fever. *Indian Pediatr* 2012;49:760.
- [11] Sriram S, Kavalakatt JA, Pereira Ad, Murty S. Bilateral panophthalmitis in dengue fever. *Ann Trop Med Public Health* 2015;8:217-8.