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Ocular Complications in Dengue Fever

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Abstract
Background: *Dengue fever is a hyper endemic viral infection in South-East Asia. We report some relatively rare cases of ocular complications of dengue fever.*
Objective: To study the ocular manifestations of dengue fever.
Materials and Methods: *The study was conducted among 532 patients diagnosed with dengue fever from May-June 2016 in a rural tertiary care hospital in Kerala, India. These patients were subjected to detailed ocular examination.*
Result: *A total of 8 patients (1.5%) were diagnosed to have ocular complications of dengue fever which comprised of anterior segment complications, posterior segment complications and transient changes in refraction.*
Conclusion: *The proportion of patients with ocular complications of dengue fever is very low in our study. However the ocular complications can range from subconjunctival haemorrhage, transient changes in refraction to severe posterior segment complications like neuroretinitis, choroiditis and macular oedema. Our study reveals transient myopia as a possible ocular manifestation in dengue fever which is not documented in other studies. This low proportion of ocular complications as reflected in this study may be due to better awareness about dengue fever in a very literate state like Kerala, better access to health care, early detection and timely medical intervention.*
Keywords: *Dengue fever, ocular manifestations, neuroretinities, macular oedema.*

Introduction

Dengue fever (DF) and dengue haemorrhagic fever (DHF) are diseases that are endemic in the tropics and warm temperate regions of the world. The highest incidence occurs in Southeast Asia and India. Worldwide cases of illness exceed 100 million per year. [1]The disease is caused by four antigenically similar but immunologically distinct serotypes of dengue virus of the genus Flavivirus, transmitted generally by Aedesaegypti and is the most prevalent form of flavivirus infection in humans. [2, 3]

Dengue fever is hallmarked by an abrupt onset of fever along with symptoms of malaise, sore throat, rhinitis, cough, headache, myalgia, retro-orbital pain, lumbosacral pain and rash. Other clinical manifestations are related to the bleeding diathesis from thrombocytopenia. [3]

The last few years have thrown light on a multitude of ocular complications associated with Dengue fever. The commonly encountered complications include conjunctival haemorrhages, macular oedema, and retinal haemorrhages. Less common ones include exudative retinal detachment, anterior uveitis, periphlebitis, branch retinal vein occlusion, vitreous haemorrhage and panophthalmitis. A majority of patients were reported to have residual visual impairment secondary to maculopathy and optic neuropathy. [4, 5,6,7,8]

It is also important to know that dengue fever has the potential to cause irreversible bilateral blindness by causing bilateral vitreous haemorrhage[9], bilateral stellar neuroretinitis[10], bilateral choroidal effusion[11] or even bilateral acute angle closure glaucoma[12], oculomotor paralysis[13] and optic neuropathy[14].Rarely reports of opsoclonus indicating encephalopathy are also seen[15].

Thrombocytopenic state in dengue fever result in haemorrhagic manifestations in the form of conjunctival haemorrhage, retinal dot blot haemorrhages in the macula and retinal periphery. An inflammatory process resulting in a hyper permeable state may account for the presence of periphlebitis, anterior uveitis and macular oedema. [8, 17]

The pathological process of dengue ophthalmic complications is complex. Ocular complications are usually seen in young adults who often present at the nadir of thrombocytopenia.[8] The main objective of this study is to analyse the ocular complications associated with Dengue fever.

Materials and Methods

Objective: To study the ocular manifestations in patients with Dengue fever.

Methodology

Type of Study: Retrospective observational study.

Study Population: Patients with clinical features of Dengue fever with associated thrombocyto-penia with NS1 positivity admitted in our hospital from 1st May 2016-30th June 2016.

Study Duration: 4 months

Study Period: March – June 2017

Proposed Intervention: Hospital records of the study population will be evaluated for ocular manifestations.

Data will be collected from the hospital records regarding:

- Best corrected visual acuity / Pinhole visual acuity
- Findings on slit lamp examination
- Findings on fundus examination performed using 90D lens

Inclusion Criteria

- Patients with clinical features of Dengue fever
- With thrombocytopenia (platelet count <1.5 lakh / microliter of blood)
- With NS1 antigen positivity

Exclusion Criteria

- Charts with incomplete data

Sample Size

In the reference study from Bangaluru by Rani Sujatha et al reported in the International Journal of Medical Science and Public health, it was found out that out of a total of 120 patients with Dengue fever, ocular findings were present in 68 patients (56.7%).

To calculate the sample size for this cross sectional study, to assess the proportion of ocular findings in patients diagnosed with serology to have dengue fever admitted to this rural tertiary care hospital in South India, we have taken the expected proportion for calculating the sample size to be 0.567.

Formula

$$n = \frac{Z^2 1\text{-}\alpha/2\ pq}{d^2}$$

Where,

p:Expected proportion,

q:1-p

d :Absolute precision

1-α/2 :Desired confidence level

Sample size calculation for Single Proportion – Absolute precision of 8 %

Expected Proportion = .567

Precision (%) = 8

Desired confidence level (%) = 95

Required sample size = 148

Ethical Considerations: Approval for the study was obtained from the institutional review board and ethical committee. All data collected in this study was carefully used by authorised personnel and confidentiality was maintained. Anonymity was maintained using code numbers for identification

Results

Of the 532 dengue patients evaluated, only 8 patients (1.5%) were found to have dengue related ocular complications.

Both anterior and posterior segment ocular complications were seen in patients with dengue fever. Two of them had SCH (subconjunctival haemorrhage), one each had conjunctivitis and periorbital oedema, two had serious complications with retinochoroidal involvement with associated macular oedema. Two patients had complained of blurring of vision but anterior and posterior segment examinations were normal. Upon refraction they were found to have myopia. The myopic shift in refraction reverted to emmetropia on later follow up as the patients recovered from dengue fever.

Among the 8 patients who had ocular complications, 4 had anterior segment complications (50%); 2 had posterior segment complications (25%) & and two had transient change in refraction (25%).

Figure 1 Dengue patients with ocular manifestation

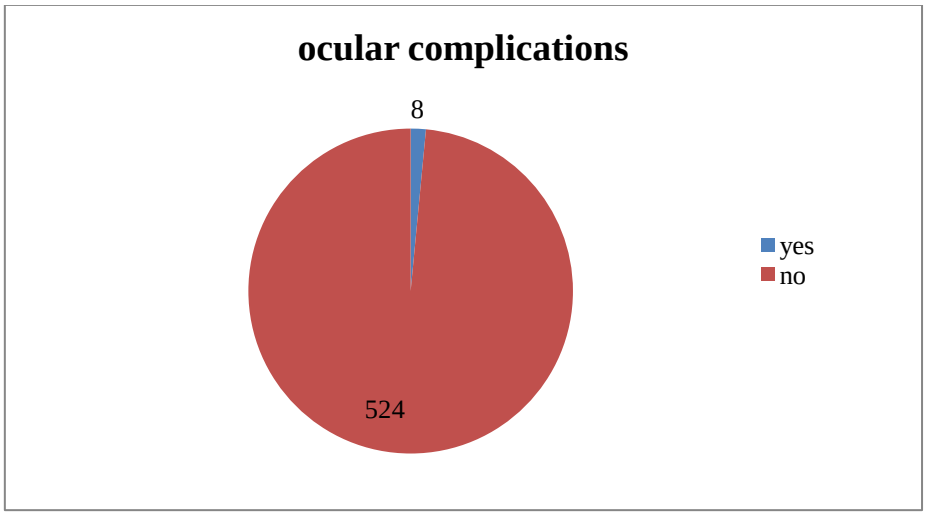
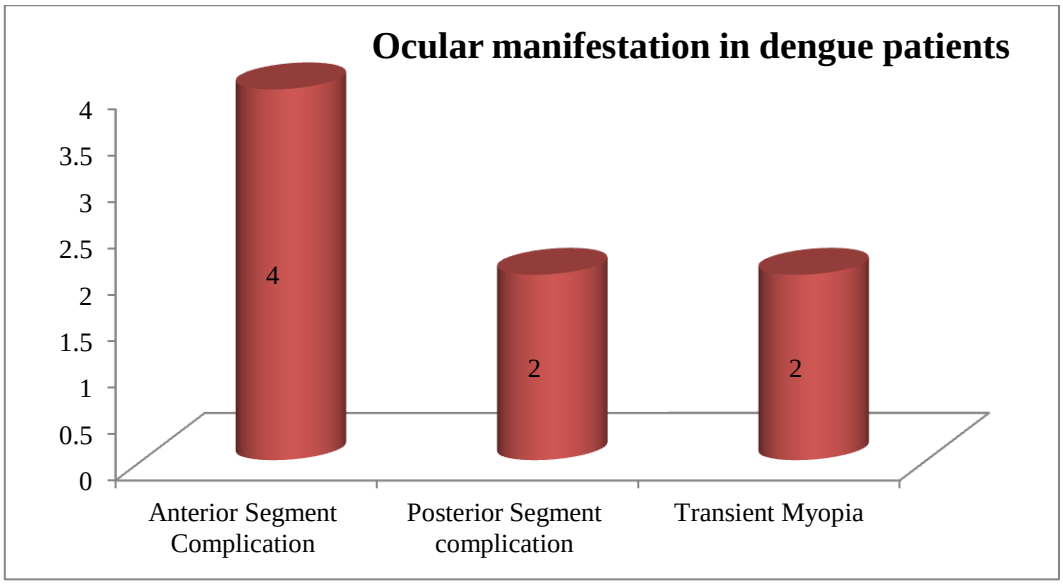


Table 1: Ocular manifestations in the dengue patients

Ocular complications	Numbers
Subconjunctival haemorrhage	2
Periorbitaledema	1
Conjunctivitis	1
Choroidities with macular oedema	1
Neuroretinitis with macular edema	1
Transient myopia	2



Discussion

The prevalence of ocular complications of dengue in this study was found to be 1.5% while in a similar study by Rani Sujatha et al the prevalence is 56.7%.[2]. The low prevalence may be due to greater awareness among the population of Kerala where literacy rate is high, better access to health care, early detection and timely medical intervention.

The ocular complications of dengue fever mentioned in previous studies include posterior segment complications such as macular oedema, vascular occlusion, vitreous haemorrhage, optic neuropathy, chorioretinitis, vasculitis with retinal haemorrhages and cotton wool spots[5,6,7].In our study too we had patients with neuroretinities, choroidities and macular oedema.

The anterior segment complications documented in other studies include subconjunctival haemorrhage, anterioruveitis, ptosis, periorbital ecchymosis and globe rupture.[8,17] In our study too we had similar anterior segment findings. Transient myopia was not documented as an ocular manifestation of dengue in any previous study.

Since a spectrum of ocular complications have been reported in dengue fever including severe ones like choroiditis, macular oedema and neuroretinitis which can have devastating visual squeal, detailed ocular examination and regular follow up is essential. Nevertheless studies should be done focussing on the pathogenesis of these ocular complications in order to have a better understanding regarding their course, prognosis and management.

Conclusion

In this study, it is found that only a minority (1.5%) of patients developed ocular complications of dengue fever. The complications can manifest as a myriad of findings that range from sub conjunctival haemorrhage, transient changes in refraction to severe posterior segment complications such as neuroretinitis, choroiditis and macular oedema. Therefore detailed ocular examination is mandatory in all patients with dengue fever.

This low proportion of ocular complications of dengue fever, as reflected in this study, may be due to better awareness about dengue fever in a very literate state like Kerala, better access to health care, early detection and timely medical intervention.

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