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DENGUE RELATED OCULAR COMPLICATIONS: A CASE SERIES.

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ABSTRACT

Dengue fever is a common mosquito-borne viral disease in the tropics with known multisystemic complications. Dengue related ocular manifestation is relatively unusual and may present with wide spectrum of ocular manifestations. We report three cases of uncommon dengue related ocular complications with different ocular manifestations, its management and sequelae. Early recognition and close monitoring of ocular sequelae from dengue infection is warranted to prevent irreversible visual damage

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Keywords: Dengue fever, macular oedema, sixth nerve palsy, tonic pupil

INTRODUCTION

Dengue fever (DF) is a mosquito-borne viral disease that is most commonly found in the tropics. It is caused by *Flaviviridae* virus and transmitted to humans by the bite of an infected female *Aedes Aegypti* mosquito. The incidence of dengue has grown dramatically around the world in recent decades with the highest incidence in Southeast Asia, India, and the American tropics. Worldwide cases of illness exceed 100 million per year.[1,2]

Ocular complications related to DF have not been classically described. These ocular complications are not common and were previously considered rare. However, there have been several reports of wide spectrum of ocular complications ranging from mild to severe manifestations associated with DF in the last two decades.[3-10]

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CASE REPORT

Case 1

A 34 years old Malay lady with no medical illness was diagnosed to have DF with transaminitis. She initially presented with fever for six days duration associated with warning sign of DF which was persistent vomiting. The diagnosis of DF was confirmed by positive dengue IgM antibodies. On the seventh day of illness, during the defervescence phase of DF, she noticed central blurring of vision in her left eye.

Ocular examination revealed visual acuity of 6/6 in the right eye (OD) and 6/36 in the left eye (OS). Bilateral anterior segment examination was unremarkable. Left fundus examination revealed macula oedema with retinal haemorrhages (Figure 1a). Right fundus examination revealed normal findings.

Laboratory investigations during the defervescence phase of DF showed low white cell counts of 2.80×10^9/L and low platelet level of 102×10^9/L. Optical coherence tomography (OCT) of left macula showed presence of

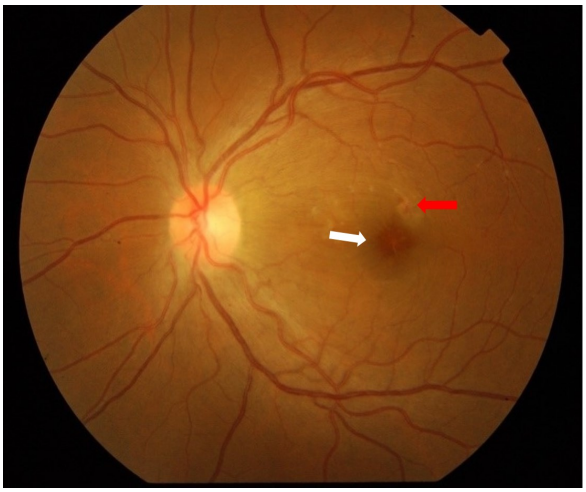

Figure 1a: Left fundus revealed macula oedema (white arrow) and retinal haemorrhages (red arrow).

intraretinal fluids (Figure 1b). Fundus fluorescein angiography (FFA) revealed evidence of leakage over the nasal region of the left fovea with no capillary fall out (Figure 1c).

She was treated with oral prednisolone 60mg daily with weekly 10mg tapering dose. Her right vision improved to 6/9 within one month with complete resolution of the macula oedema.

Case 2

A 25 years old healthy, Malay gentleman presented with symptomatic viral fever which was serologically confirmed as DF by detection of dengue specific IgM antibodies. He developed binocular diplopia during the reabsorption phase of DF in which blood investigations at that time revealed haematocrit level of 46.4% with low white cell counts of 2.28×10^9/L and normal platelet level of 219×10^9/L.

His visual acuity was 6/6 bilaterally (OU). Ocular examination revealed a right sided convergence squint and restriction of right lateral gaze consistent with right isolated sixth nerve palsy. His anterior segment, fundus and neurological examination were unremarkable. His Hess chart showed paralysis of the right lateral rectus muscle (Figure 2) and contrast-enhanced computed tomography (CECT) of the brain was normal.

He was started on intravenous methylprednisolone 500mg daily for 3 days followed by tapering dose of oral prednisolone. He regained full extra ocular muscle movement after 1 week post-completion of the course of intravenous steroid.

Case 3

A 38 years old, Malay lady with no medical illness, presented with sudden onset of painless blurred vision and glare in the right eye for three days duration. The ocular symptoms were preceded by two days history of fever, retro-orbital pain, headache with no warning signs of DF.

Her ocular examination revealed visual acuity of 6/6 OU with impaired accommodation in OD. There was presence of anisoco-

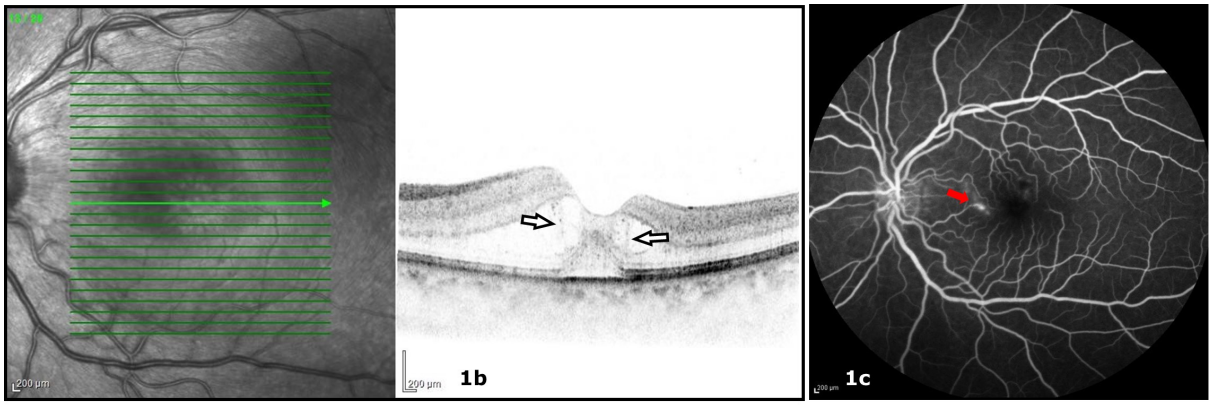

Figure 1b: OCT of left macula showed presence of intraretinal fluids (black-lined arrows) and Figure 1c: FFA of the left eye revealed evidence of leakage (red arrow) over the nasal region of the fovea.

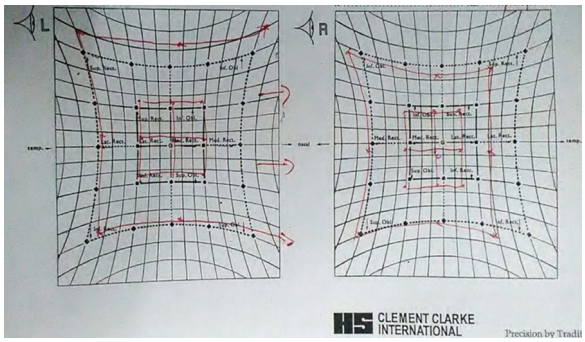

Figure 2: Hess chart showing right lateral rectus under action and left medial rectus over action suggestive for right lateral rectus palsy.

ria with right pupil of 6 mm and left pupil was 3 mm in the bright light (Figure 3a). The 0.125% pilocarpine test was positive with significant miosis in the right pupil while the left pupil showed no changes in the pupil size (Figure 3b). The intraocular, cranial nerve and other neurological examinations were unremarkable.

She was referred to neurology team for further evaluation and opinion regarding her clinical findings. Subsequent workups of syphilis serology, cerebrospinal fluid (CSF) analysis from lumbar puncture, CECT and magnetic resonance imaging (MRI) of the brain revealed normal results. Her blood investigations upon presentation revealed features of critical phase in DF with evidence of leucopenia 1.93×10^9/L, thrombocytopenia of 102 x 10^9/L and haematocrit of 32.9%. The diagnosis of dengue fever was confirmed with positive dengue IgM and NS 1 antigen test.

She was treated symptomatically for DF and her right pupil mydriasis resolved after 3 months from the initial presentation.

DISCUSSION

Dengue is the most common mosquito borne viral disease in human. It has become a major international public health concern with increasing prevalence.[1] Dengue related ophthalmic manifestation were once thought to be rare; however, a recent systematic review reported over 686 cases of DF related ocular complications.[3] The precise pathophysiology of dengue ophthalmic complications is not well understood, but it was postulated to be due to thrombocyptopenia and immune mediated reaction. The thrombocytopenic state of DF results in bleeding tendency which manifest as retinal haemorrhages. In addition, active immune mediated response may lead to plasma leakage leading to macular oedema and breakdown in the blood aqueous barrier resulting in uveitis and periphlebitis.[4]

The onset of ocular symptoms usually occurred within 1 week after the onset of fever. [5,6] The delayed onset of ocular symptoms are most probably due to immune mediated mechanism rather than direct viral infection.[4] The ocular symptoms also had been observed to correlate with the nadir of platelet level during the dengue infection.[5] This correspond to our first and third cases, where the ocular symptoms were manifested during the thrombocytopenic state of DF with platelet count of 102 x 10^9/L in both cases.

Dengue mostly affect the posterior segment of the eye with most common presenting complaint is blurring of vision and scotoma which may closely related to maculopathy.[3] Dengue related maculopathy usually demonstrates features of vascular occlusion or vasculitis in FFA. A study by Bascal et al., reported that FFA are able to pick up 25 % of eyes with vascular occlusion and 16% of eyes

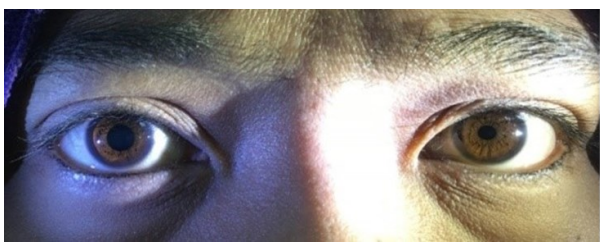

Figure 3a: Anisocoria (abnormal mydriasis in right pupil) was greater in bright light).

Figure 3b: Miosis in the right pupil and unchanged left pupil size, after application of 0.125% pilocarpine eyedrops.

with vascular leakage.[7] As presented in our first case, the patient was diagnosed with dengue maculopathy with FFA result showing evidence of vascular leakage.

Dengue related neuro-ophthalmic complications are relatively uncommon. There are only few reported cases on dengue related neuro-ophthalmic complications especially abducens nerve palsy.[9,10,11] The pathogenesis of neurological manifestations was believed to be immune-mediated and neurotrophic effects of dengue virus. In relation to our second case, the patient presented with delayed onset of right isolated abducens nerve palsy during the defervescence phase of dengue fever which suggest the immune mediated theory.

In addition to dengue related neuro-ophthalmic manifestations, this is the first reported case of DF presented with tonic pupil as presented in the third case. Tonic pupil is a rare condition that results from denervation of postganglionic parasympathetic fibres leading to a supersensitive response to weak cholinergic agonists (e.g. pilocarpine, 0.125%). The most common causes of tonic pupil are idiopathic. However, it may occur following infection, inflammation, trauma, tumour or ischemia.[12,13] These possible causes were excluded in our third case. We postulate that the DF may have caused impairment of the ciliary ganglion parasympathetic function. This may also be an incidental finding.

CONCLUSION

Dengue is an endemic viral fever that may present with wide spectrum of ocular manifestations. The ocular related complications are becoming increasingly important as the dengue epidemic continues to rise in tropical countries. The overall prognosis is good with majority of cases being self-limiting. However, early diagnosis and prompt treatment hasten the recovery time and reduce ocular morbidity.

DISCLOSURES

The authors declared that they have no competing interests. Author acknowledged that consent has been obtained from patient to publish the images.

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