



Spontaneous globe rupture: Unusual ophthalmic manifestation with dengue hemorrhagic shock syndrome

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ABSTRACT

Purpose: We report an unusual manifestation of spontaneous globe rupture in a 9 year old male child with dengue hemorrhagic shock syndrome.

Observations: Nine year old male was admitted in the pediatric intensive care unit in a state of altered sensorium secondary to dengue hemorrhagic shock syndrome. Ophthalmic examination revealed proptosis and hemorrhagic chemosis of the right eye. Within two hours of presentation, spontaneous globe rupture with extrusion of intraocular contents occurred in spite of aggressive treatment and intravenous methylprednisolone.

Conclusions and Importance: Spontaneous globe rupture in a child with dengue hemorrhagic shock syndrome with such a rapid course is being reported for the first time in literature. Ophthalmologists and pediatricians should be alert regarding vision threatening manifestations related to dengue hemorrhagic shock syndrome.

1. Introduction

Infection with the dengue virus, transmitted by the *Aedes* mosquito, may range from asymptomatic febrile illness to fatal haemorrhagic fever and affects up to 100 million people per year worldwide. Severe dengue haemorrhagic fever is characterised by extensive plasma leakage, bleeding and multiple organ involvement manifested as elevated liver enzymes, encephalopathy and myocarditis. Plasma leakage is manifested by a rise/drop in hematocrit, fluid extravasation in the lungs or abdomen leading to respiratory distress and dengue shock syndrome. Dengue haemorrhagic shock syndrome (DHSS) is a major reason for hospital admission and mortality in children. If not treated adequately, mortality can be as high as 20%. With appropriate and aggressive management, mortality can be reduced to less than 1%, depending on the availability of appropriate supportive care.¹

Patients with dengue fever may have a wide spectrum of ocular symptoms ranging from asymptomatic to mild blurring of vision to serious vision threatening complications like spontaneous globe rupture and panophthalmitis. The purpose of this case report is to create awareness regarding sight threatening complications related to dengue hemorrhagic shock syndrome.

2. Case report

A nine year old male child presented to the pediatric emergency department with a history of high grade fever, abdominal pain and vomiting for the last seven days. Parents of the child reported onset of altered sensorium 6 hour before presentation. Patient had been diagnosed as a case of dengue at another health care facility and was managed for low platelet count (18000/microliters). Parents gave history of two random donor platelet transfusions.

At the time of admission, the pulse of the patient was weak with a blood pressure recording of 80/50 mmHg in right arm supine position. Patient was treated for dengue hemorrhagic shock as per protocol with aggressive supportive therapy and six random donor platelet transfusions.

Ocular examination was done in the pediatric intensive care unit (PICU); visual acuity and ocular movements could not be assessed due to altered state of consciousness. There was no history of trauma or any ocular symptoms before admission. Ophthalmic examination revealed proptosis, lid edema and hemorrhagic chemosis in inferior quadrant and diffuse hyphema in the anterior chamber (Fig. 1a). Crystalline lens was in place. Fundus details were not visible. The intraocular pressure (IOP) was high digitally. Hutchinson's pupil stage II was elicitable indicating

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raised intracranial pressure. The examination of the left eye was within normal limits. Patient was started on topical medication in the form of dorzolamide 0.3% and timolol 0.5% twice daily to lower the intraocular pressure. Intravenous mannitol and other hyper osmotic agents were contraindicated due to deteriorating blood pressure. Intravenous methylprednisolone 1 gm was given in 500 ml saline over 45 minutes in view of immune mediated pathology. Pressure bandaging was done and the lateral canthotomy was deferred to avoid excessive bleeding.

Regular monitoring was done. However full chamber hyphema and extensive hemorrhage was noticed nasal to the limbus after 2 hours of first examination (Fig. 1b). Contrast enhanced magnetic resonance imaging (CEMRI) brain and orbits were done to rule out intracranial bleed and globe rupture. MRI brain revealed dengue hemorrhagic encephalitis. Orbital cuts with FLAIR in Axial, Coronal and Sagittal sections were obtained with CEMRI Siemens Avanto MRI machine (1.5 T). Contrast enhanced axial section of orbit T2W1 and non contrast enhanced magnetic resonance imaging of the right orbit showed anterior displacement of the globe with enlargement of the right eyeball; retrobulbar hemorrhage; vitreous hemorrhage; suprachoroidal hemorrhage and choroidal detachment with dilatation of the retrobulbar space. Break in continuity of outer wall of eyeball with extrusion of intraocular contents is visible in the Sagittal section (Fig. 1 d, e, f). The child was conservatively managed with antibiotic eye ointment and pressure bandage as his platelet count was still very low and systemically was in shock. However the child succumbed to extensive systemic involvement in spite of aggressive management.

3. Discussion

Dengue fever is generally self-limiting, with less than 1% case fatality. The acute phase of the illness lasts for 2–7 days, but the convalescent phase may be prolonged for weeks associated with fatigue, especially in adults. Prognosis in dengue haemorrhagic fever and dengue shock syndrome depends on prevention, early recognition and treatment of shock. Once shock sets in, fatality may be as high as 12%–44%.¹

Although the pathogenic mechanism of the ocular complications associated with dengue fever remains unclear, the mechanism is believed to be immune-mediated and secondary to severe thrombocytopenia rather than a direct viral infection.² Ophthalmic manifestations are rare and range from non significant subconjunctival hemorrhage to optic neuropathy with macular involvement. Vision threatening ocular manifestations in adults have been reported namely retro-bulbar hemorrhage with globe luxation, suprachoroidal hemorrhage with globe rupture, endogenous endophthalmitis with panophthalmitis and massive suprachoroidal hemorrhage.³ Another report demonstrated globe rupture which occurred on the third day of presentation, which finally went into phthisis.⁴

A rapid course of this ophthalmic manifestation of DHS in a child is an alarming signal to identify the shock at an early stage and warrants aggressive possible management. Proptosis in dengue patients due to retrobulbar hemorrhage and secondary to panophthalmitis has been previously reported.^{5,6} In our patient, the proptosis was secondary to the retrobulbar hemorrhage and suprachoroidal hemorrhage. The vitreous hemorrhage, suprachoroidal hemorrhage and retrobulbar hemorrhage could have occurred spontaneously due to severe thrombocytopenia and immune mediated mechanism.

Possible mechanism for globe rupture could be an increase in intraocular pressure which is evident from the enlargement of the eyeball as seen on radiological examination and increased intraorbital pressure which results in dilatation of retrobulbar space secondary to retrobulbar and suprachoroidal hemorrhage. Children have thinner scleral walls,⁷ and have decreased scleral stiffness that may lead to rapid progression. In addition to dengue hemorrhagic shock syndrome, associated thrombocytopenia, multiple random donor platelet transfusions may also be responsible for the immunological reactions in the body. All these factors in turn may cause bleeding and increased pressure in the eye and cumulatively may result in spontaneous globe rupture. Adopting measures such as pressure bandaging and lowering of IOP by medical and surgical methods along with immediate pulse steroid therapy at very early presentation may stop progression to severe vision

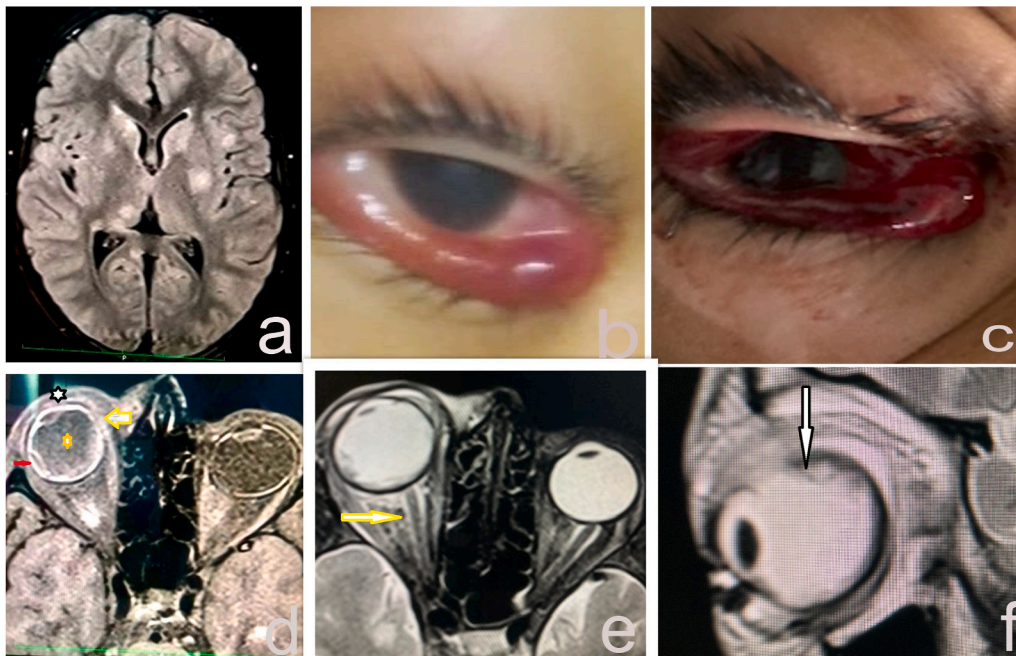


Fig. 1. (a) Axial cut section of brain obtained by contrast enhanced magnetic resonance imaging (CEMRI) FLAIR showing spectrum of findings of dengue hemorrhagic encephalitis. (b) Diffusely illuminated clinical picture of right eye on first examination showing anterior displacement of the right globe, hemorrhagic chemosis of inferior quadrant and mid-dilated pupil with hazy media. (c) Spontaneous globe rupture with extrusion of intraocular contents. (d, e) Contrast enhanced axial section of orbit T2W1 and non contrast enhanced magnetic resonance imaging of the right orbit marked with asterisk and arrow showing anterior displacement of the globe (black asterisk) with retrobulbar hemorrhage (yellow arrow in e), vitreous hemorrhage (yellow asterisk) and suprachoroidal hemorrhage and choroidal detachment (red arrow) with dilatation of the retrobulbar space and enlargement of the right eyeball. Break in continuity of the outer wall of the eyeball is also visible (yellow arrow). (f) Non-contrast enhanced MRI Sagittal section of right orbit T2WI showing discontinuity in the outer coat of eyeball with extrusion of intraocular superiorly

near the insertion of superior rectus muscle (arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

threatening complications.

After thorough literature search, we could not elicit a similar report of spontaneous globe rupture secondary to DHSS in a child. This makes this case report unique and first of its kind. This also raises an alarm for ophthalmologists and paediatricians to keep an eye on vision threatening complications.

4. Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. Written consent has been obtained from the patient's guardian.

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Authorship statement

All authors attest that they meet the current ICMJE criteria for Authorship.

Declaration of competing interest

There are no conflicts of interest. All the authors have no financial disclosures. (RK, HS, AS, JS).

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