



CONCURRENT MALARIA AND DENGUE COINFECTION IN A PATIENT WITH HERPES SIMPLEX VIRUS 1 ENCEPHALITIS: A CASE STUDY.

General Medicine

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ABSTRACT

Dengue and malaria are both endemic in several parts of India and represent a major public health burden in this region. Very few cases of concurrent infection with dengue and malaria have been reported from North East India. Here, we present a case of a young male returning from a dengue endemic area who tested positive for the virus along with *Plasmodium vivax* and later found to have herpes simplex virus 1 encephalitis.

KEYWORDS

INTRODUCTION

Despite a wide overlap between malaria and dengue endemic areas, published reports of co-infections are scarce in the literature. Though there have been some case reports of concurrent infection with dengue and malaria, yet there are only few cases of such infections reported from South Asia.¹ Febrile illness with reduced consciousness is one of the most important reasons for acute hospital admission. One of the most common causes is cerebral malaria, which is due to sequestration of parasitized erythrocytes in the cerebral micro vasculature. Little attention has been paid to the possible role of viral CNS infections in comatose patients. Viruses could be an important cause of CNS infection, and could interact with malaria parasites to increase disease severity.² Here, we present a case of a young male returning from a dengue endemic area who tested positive for herpes simplex 1 encephalitis along with *Plasmodium vivax*.

CASE

A 28-year-old male, resident of Chhyagaon, Assam, businessman by Occupation presented to the emergency department with fever, chills, myalgias, and headache for two days followed by altered sensorium for last 1 day. Physical examination was unremarkable except neck rigidity was present. Haemogram revealed a normal study except for a low platelet count of 86,000/mm³. His renal and liver function tests, spot urine examination, chest X-ray, and USG abdomen were ordered and all parameters were within normal limits. Since the patient was found to have a low platelet count, a viral serology test using Ig M ELISA for dengue virus was carried out that turned out to be positive. A diagnosis of dengue fever was made and supportive therapy was initiated. Patient continued to have fever spikes and chills despite the therapy. Rapid card test for malaria along with thick and thin blood smears for malarial parasite was also carried out. The Malaria Ag (pLDH/HRP2) card test was negative for *Plasmodium falciparum* and blood smears showed multiple stages of *Plasmodium vivax*. This suggested that the patient had concurrent dengue fever and malaria. A lumbar puncture performed concurrently revealed an opening CSF pressure of 19 cmH₂O. The CSF analysis revealed a white blood cell (WBC) count of 5 cells, a red blood cell (RBC) count of 0, a protein level of 102 mg/dL, and a glucose level of 37mg/dL. A CSF PCR for viral isolates was ordered, the result of which became available 72 hours after the lumbar puncture had been performed. The CSF PCR was positive for HSV1 DNA and negative for Enterovirus as well as for Varicella Zoster Virus. A viral culture was not performed. Bacterial as well as fungal cultures of the CSF were negative. The patient was put on artesunate and acyclovir therapy. The patient's symptoms worsened with increasing confusion even after starting acyclovir therapy. HIV test was negative, both for antibodies for HIV 1/2 by ELISA and for

antigens/ antibodies by enzyme immunoassay. An MRI of the brain performed after injection of gadolinium on day 2 of acyclovir (day 8 of the illness) revealed normal parenchyma. The patient deteriorated and he succumbed to the illness 4 days after admission.

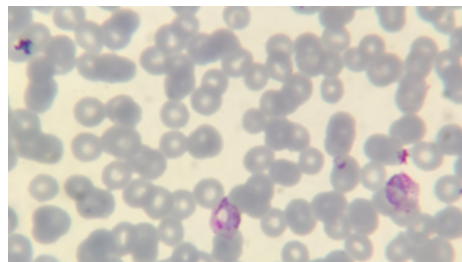


Fig. 1. Young Amoeboid Trophozoites of Plasmodium Vivax in peripheral blood.

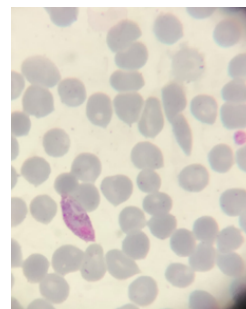


Fig.2. Gametocyte in peripheral blood

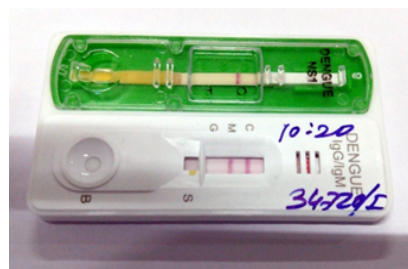


Fig.3. Dengue ELISA IgM card Test positive.

DISCUSSION

Concurrent infection with different infective agents leads to an overlap of their clinical features that can pose a diagnostic challenge to the physician, especially in endemic areas. In addition, recent studies indicate that a co infection may be more severe.³ The first case of concurrent dengue and *Plasmodium falciparum* was published by Charrel et al. in 2005 where the concurrent infection was diagnosed in a patient returning to France after 18-day travel to Guinea, Senegal, and Sierra Leone.⁴ It was followed by a case report of concurrent dengue with *Plasmodium vivax* in 2006 while Bhalla et al. reported the first case from India in 2006.^{5,6} The accuracy of a serological test to diagnose dengue in patients experiencing malaria has been questioned earlier because reactivity is often nonspecific on certain rapid serological assays; however, IgM ELISA serological test has demonstrated more than 90% specificity for dengue.⁷ Earlier analysis by Bharti et al. revealed that overall the rapid diagnostic card test for *Plasmodium falciparum* and *Plasmodium vivax* was 93% sensitive and 85% specific with a positive predictive value (PPV) of 79% and a negative predictive value (NPV) of 95%.⁸ According to Carme et al. in French Guiana the specific rate of concurrent malaria and dengue infection from overall febrile patients was equal to 0.99, which indicates that there is high chance of concurrent infection in that setting.⁹ It would be expected therefore that since both infections are endemic in our area, coexisting malaria and dengue infection could be common. However, there is little published evidence of such dual malaria and dengue infections despite both diseases being co endemic in South Asian region. Malaria and dengue are difficult to differentiate clinically as is emphasized by this case, yet the treatment of the illnesses is different and delay in appropriate therapy can be devastating, especially in malaria.¹⁰ Endemic areas of malaria and dengue overlap to a large extent in South Asia and acquisition of both mosquito-borne infections concurrently is quite possible. We suggest that such concurrent infections should always be kept in mind by the physician while encountering such clinical situations as such mixed infections are likely to occur more frequently than reported in the available literature.

Asymptomatic parasitaemia certainly does occur, and coincidental *Plasmodial* infection is recognised in patients with bacterial meningitis.¹¹ Alternatively, could patients have a coincidental viral infection? Although detection of viruses outside the CNS, particularly from non-sterile sites such as the rectum, might be coincidental, virus detected within the CNS is usually deemed to be pathogenic, especially if it is associated with a recognised neurological syndrome.¹² How viruses and malaria parasites might interact is unknown. In studies of sepsis and malaria, the effect of microvascular parasite sequestration on the integrity of the gut mucosa is thought to allow bacterial seeding into the blood stream and hence bacteraemia.¹³ A similar effect, disrupting the endothelial cell junctional proteins of the blood-brain barrier, might damage the barrier and allow virus into the CNS; in which case, detection of virus in the CSF could be a result of this disruption, with the virus playing no part in pathogenesis.¹⁴ Additionally, viruses are known to trigger upregulation of vascular endothelial adhesion molecules, such as ICAM-1, which might lead to increased sequestration of parasitised erythrocytes, thus exacerbating malaria-related cerebral injury.¹⁵

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