Acute Disseminated Encephalomyelitis (ADEM) is a multifocal, monophasic, acute demyelinating disease of the brain and spinal cord, which is commonly preceded by viral infections and occasionally bacterial infections or immunizations. Its occurrence following malarial infection, especially Plasmodium vivax Malaria is very uncommon. We report an 11-year girl who presented with clinical features of encephalopathy and generalized convulsions, 10 days following complete recovery from the Plasmodium vivax Malaria. Diagnosis of ADEM as a complication of Plasmodium vivax Malaria was made based on acute onset of neurological events, characteristic findings on Magnetic Resonance Imaging (MRI) of brain and prompt response to corticosteroid therapy. Follow-up MRI, 6 months after discharge, showed complete resolution of change found on the initial MRI. To the best of our knowledge, only two such cases have been reported in the English literature till date.

Key Words: Acute disseminated encephalomyelitis. Plasmodium vivax malaria. Magnetic resonance imaging (MRI).

INTRODUCTION

Acute Disseminated Encephalomyelitis (ADEM) is a multifocal, monophasic, acute demyelinating disease, usually occurring 1 - 3 weeks following febrile viral infections and occasionally bacterial infections or immunization.1,2 ADEM as a neurological manifestation after complete recovery from severe malaria, particularly caused by Plasmodium falciparum, have been reported recently in a few literatures.3-7 However, its occurrence after treatment of Plasmodium vivax Malaria is very rare. To the best of our knowledge only two such cases have been reported in the English literature.8,9

Here, we report an 11-year girl with acute onset of neurological disturbances after 10 days of complete recovery from Plasmodium vivax malaria.

CASE REPORT

An 11-year girl was admitted with fever, headache and vomiting for 4 days and an episode of generalized convulsion and altered consciousness on the day of admission. Fever was of high grade, intermittent type, associated with chills and rigors. Child was conscious but confused, febrile and pale. General examination that revealed temperature of 39°C, pulse rate of 110/minute, respiratory rate of 28/minute and blood pressure: 106/90 mm of Hg. Central nervous system examination showed Glasgow Coma Scale (GCS) of E4 V3 M6, bilateral flexor planter and preserved tendon reflexes without signs of meningeal irritation. Abdominal examination revealed mild hepatosplenomegaly. Examination of other systems were normal.

Laboratory examinations revealed anaemia (haemoglobin: 8.5 g/dL) and thrombocytopenia (platelet count: 85 x 10^3/L). Peripheral blood films showed trophozoites of Plasmodium vivax with a parasitemia of 12%. Rapid malaria antigen test was also positive for Plasmodium vivax. Examination of Cerebrospinal Fluid (CSF) was normal. He was treated with injection Artesunate as per guideline and became afebrile after 24 hours. Repeat peripheral smears after 24 and 48 hours were negative. He was discharged on Artesunate Combination Therapy (ACT) for 3 days and Primaquine for 14 days.

Ten days later, he was readmitted with sudden onset fever, generalized tonic-clonic convulsions and loss of consciousness. On admission, he had a GCS of E2 V1 M3 and decerebrate posturing. There were no meningeal signs and no cranial nerve palsy. Examination showed bilateral exaggerated deep tendon reflexes with positive Babinski response. Rest of the systemic examination was normal. Routine blood investigations including complete blood count, blood sugar, serum electrolytes, and renal and liver function tests were within normal limits except for mild anaemia (Haemoglobin: 9.1 g/dL). Peripheral blood smear was negative for malaria parasite on three occasions. CSF analysis revealed cell count of 60 cells/mm³ with 90% lymphocytes, protein of 86 mg/dL, blood sugar at 50 mg/dL and adenosine deaminase level of 8 U/L. Treatment with acyclovir and cefepime were started keeping in view of the possibility of viral encephalitis or bacterial meningitis. However, in spite of getting treatment, his condition further deteriorated over the next 48 hours.
MRI of brain was done after 72 hours which showed bilateral almost symmetrical hyper-intensities on T2 and flair sequences, involving periSylvian cortex and subcortical deep white matter and also in right frontal region (Figure 1a and 1b). Bacterial and Mycobacterium cultures of CSF were negative. Serologies for Herpes simplex, Japanese encephalitis, measles and mumps virus were found to be negative. Polymerase Chain Reaction (PCR) analysis of viral nucleic acid in CSF was not done as the facility for the same is not available at our centre. Taking into consideration the sudden onset of neurological events, blood pictures, CSF analysis and MRI findings, the child was diagnosed as ADEM, following Plasmodium vivax infection. Cefepime and acyclovir were stopped after MRI report. Treatment was started with intravenous methyl prednisolone 30 mg/kg and patient showed dramatic response to the above therapy. MRI screening of spinal cord was normal. On day four, he regained consciousness and started moving limbs spontaneously. On day six, he was conscious and oriented, power was normal but motor aphasia was still present. Methylprednisolone was continued for 5 days and then substituted with oral preparation and tapered over next 14 days. On day ten, he was able to speak and by day 14 of admission, he became neurologically normal and was discharged.

Child was followed-up in regular interval without having any neurological deficit. Follow-up MRI after 6 months was completely normal (Figure 1c and 1d).

DISCUSSION

The authors made the diagnosis of ADEM in this case on the basis of clinical history, neurological manifestations and MRI of the central nervous system. In the published literature, the diagnosis of ADEM following malaria was made by similar way as in this case. Etiology of ADEM following malaria remains unclear but seems to be immunologically mediated. Clinical studies and animal models have shown that plasmodia can temporarily suppress a host’s humoral and cellular immune response, predisposing it to superinfections with other microorganisms. This lag in immunologic improvement might be seen even after clinical recovery from malaria, predisposing them to the development of ADEM, which can mimic the symptoms of cerebral malaria and infectious meningoencephalitis. Absence of asexual parasitemia in index case excludes the possibility of cerebral malaria. The latency of neurological illness with characteristic diffuse multifocal involvement of white matter on MRI and remarkable improvement after steroid therapy favours the diagnosis of ADEM rather than encephalitis in this case.

One should keep in mind the entity ‘Post-Malarial Neurological Syndrome’ (PMNS) which is defined as the acute onset of neurological or neuropsychiatric symptoms in a patient recently recovered from cerebral malaria and who have negative blood film at the time of onset of symptoms. No clear demarcation line can be drawn between PMNS and ADEM as both are almost similar, in respect to latency period, multifocal neurological deficits, response to steroids and good prognosis. However, in PMNS, brain MRI can be normal or show non-specific hyperintensity as against the characteristic changes of ADEM that include diffuse or scattered hyperintensity in the white matter of brain or spinal cord and perivenular inflammation with surrounding demyelination.

Most of the patients with ADEM show spontaneous and favourable recovery. In mild cases, symptomatic treatment is usually sufficient, but in severe cases, corticosteroid usually hastens recovery. ADEM can be difficult to distinguish from the first attack of multiple sclerosis as both share common clinical and pathophysiologic aspects, but later these two can be distinguished based on clinical course of the disease, lack of relapses, and resolution of lesions on repeat MRI. Plasmodium vivax malaria should, therefore, be added to the list of infections able to precipitate ADEM.

REFERENCES


