International Journal of Neurology Sciences
www.neurologyjournal.in
Online ISSN: 2664-617X, Print ISSN: 2664-6161
Received: 01-01-2021, Accepted: 15-01-2021, Published: 30-01-2021
Volume 3, Issue 1, 2021, Page No. 1-4

A rare case report of acute disseminated encephalomyelitis following Epstein-Barr Virus infection

Somvanshi Vaibhav KR Ramavtar[1], Dilip Maheshwary[2], Bharat Bhushan[3], Vijay Sardana[4], Lathiya ashwin[1]
[1] Senior Resident, Department of Neurology, Govt. Medical College, Kota, Rajasthan, India
[2] Professor and Head, Department of Neurology, Govt. Medical College, Kota, Rajasthan, India
[3] Assistant Professor, Department of Neurology, Govt. Medical College, Kota, Rajasthan, India
[4] Senior Professor and Principal, Department of Neurology, Govt. Medical College, Kota, Rajasthan, India

Abstract
Epstein-Barr virus (EBV) infection manifest with several clinical syndromes by infecting more than 95% of the world's population. Neurological disease alone related to Epstein-Barr virus rarely develop in previously healthy individuals. It is associated with a variety of CNS complications like acute disseminated encephalomyelitis, transverse myelitis, neuropsychiatric syndrome, GBS and they usually respond to immunotherapy. Here we present a rare case of acute disseminated encephalomyelitis (ADEM) with primary Epstein-Barr virus infection, in previously healthy 15 year old male.

Keywords: intravenous immunogobuin (IVIG), acute disseminated encephalomyelitis (ADEM), ebstein barr virus (EBV)

Introduction

Acute disseminated encephalomyelitis (ADEM) is very infrequent neurological condition, more common in childhood than in adults with an approximate incidence of 0.4/100,000 per year. An immuno-competent adult rarely develops Acute Disseminated Encephalomyelitis associated with Epstein-Barr Virus (EBV) infection [2]. The CNS complications usually occur 1 to 3 weeks after the onset of EBV infection but may occur at the same phase of illness. The pathogenesis of these complications are still a mystery. Studies suggest that some complications are due to direct viral infection, whereas others are due to autoimmune mechanisms with parain factious etiology. Neurological complications are the main culprit leads to mortality in patients with EBV infection [3, 4]. The clinical symptoms are polymorphous, consisting of motor disorders, seizures, cranial nerve paralysis, altered mental status and general signs. The diagnosis of ADEM established by cerebro–medullary MRI showing multifocal demyelinating lesions in the brain and/or the spinal cord. Any unexplained encephalomyelitis pattern bring attention towards diagnosis of ADEM. Clinical improvement expected with either intravenous corticosteroids or immune globulins but the morbi-mortality benefit remains challenging.

Case Report

A 15-year-old male, with no previous relevant medical history, was admitted to the Emergency Department for gait disorders and urinary retention over the last 7 days for which he was catheterised at peripheral centre, weakness in all 4 limbs more in both lower limb than upper limb over last 3 days and altered sensorium since last 24 hours. Ten days earlier, the patient presented fever and vomiting recovered within 24 hours of antipyretic medications and fluid support at periphery centre. Upon admission, blood pressure was 120/60 mmHg, heart rate was 88/min regular; he was afebrile and saturation 98% on room air. The neurological examination revealed altered sensorium, paresis of the lower limbs and upper limbs with abolition of all deep tendon reflexes. Abdominal reflexes were absent and urinary retention were also found. General physical examination was unremarkable. Laboratory tests showed lymphocyte-dominant hyper leukocytosis at 11,730/mm3, elevated C-reactive protein (CRP) and normal liver enzymes (SGOT 20 U/l, SGPT 46 U/l, alkaline phosphatase 78 U/l). The initial brain scan was normal. The cerebrospinal fluid (CSF) showed a predominantly Lymphocytic leukorachia (25 leukocytes, 100% Lymphocytes), hyper proteinorachia (66mg/dl) and normal glucose. In view of an infectious encephalitis, empirically antiviral and antibiotic treatment was immediately started with intravenous acyclovir and ceftriaxone. The patient was then transferred to the Neuro intensive care unit. A few hours later, he developed swallowing disorders requiring temporary ryles tube feeding. Both cerebral-MRI and medullary-MRI were ordered. They showed multiple T2-FLAIR non-confluent intramedullary hyperintensity lesions extended to the whole spinal cord and Dw restriction in corpus callosum spenium with T2FLAIR hyperintensity in anterior pons dentate nuceus, bilateral front oparietal periventricular and subcortical white matter (Figs. 1A, 1B and 1C 2A, 2B). A second lumbar puncture, aiming to determine the presence of oligonucleotide bands, NMO, MOG and for viral PCR (HSV, VZV, CMV, picorna, adenovirus and entero virus), was performed, and this showed the presence of Epstein-Barr (EBV) viral DNA. Laboratory tests were completed with serologies for HBs Ag, HCV, VDRL and HIV; these were all negative except for EBV, which came back positive (IgM and IgG).

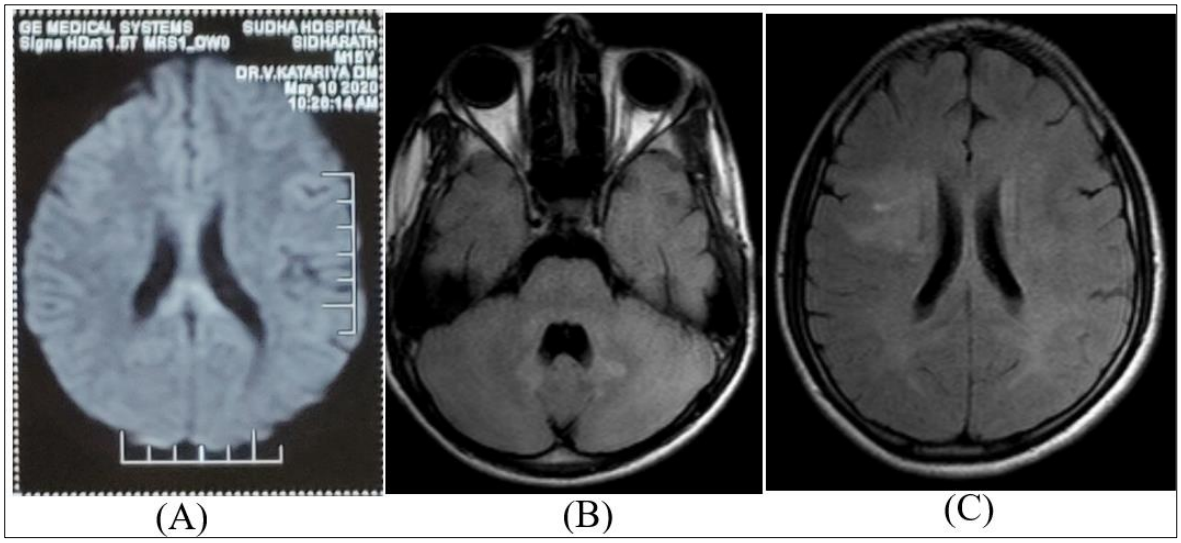

Fig 1: (A) Dw restriction in corpus callosum spenium (B) T2FLAIR hyperintensity in anterior pons dentate nuceus (C) T2FLAIR hyperintensity in bilateral frontoparietal periventricular and subcortical white matter

Final diagnosis of ADEM secondary to EBV primary infection was made. The initial treatment was discontinued and high-dose corticosteroid therapy was started (1 g/day for 5 days) along with Acyclovir. Five days later, in view of no significant improvement in symptoms IV immune globulins (2 g/kg) were added. This combination achieved a full sensory and motor recovery of the upper extremities with only partial recovery in lower extremities. The patient was discharged after 17 days of hospital stay, but paraplegia of the lower limbs persisted with mRS 4. He was followed up in neurology OPD for next 6 months and mRS improved to 1 with only subtle running difficulty with able to walk without any support.

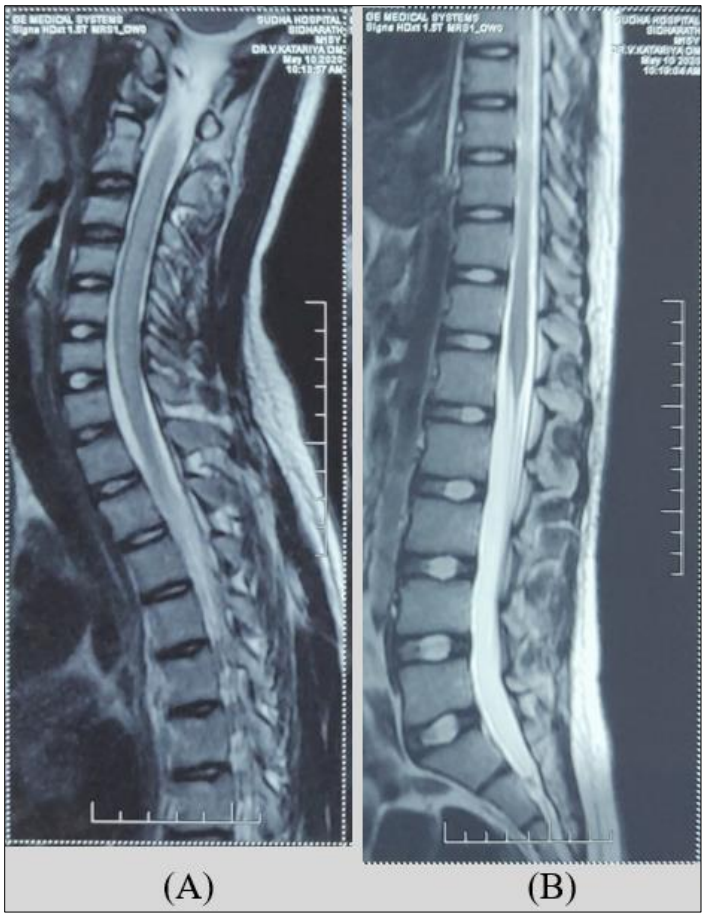

Fig 2: (A) T2-weighted medullary MRI in the sagittal plane: medullary lesions of centromedullary topography (white arrows) and hyperintensity extending over the entire cervical and dorsal (B) marrow to the cone terminal. Normal calibre of the spinal cord.

Discussion

ADEM is an inflammatory and autoimmune demyelinating disease affecting central nervous system (CNS) present in acute or sub-acute status. Children suffer with this disease more often than in young adults [1, 2]. The incidence is approximated at 0.4/100,000 individuals per year for children. The epidemiological data still lacking for adults. It seems to be having gender and seasonal inclination, with peak seen in winter and spring [3]. It is an unusual medical condition in adults. The case presented here shows marked unfavourable and rapid progression of the neurological symptoms, in contrast to what has been described in many cases of encephalomyelitis secondary to EBV that has been adequately treated. It usually develops after an infectious situation or vaccination. It has been seen that a symptom-free interval of 2 to 30 days between the triggering factor and the first clinical signs, as in our case. Among the various infectious agents involved in pathogenesis of ADEM, viruses play major role (measles, rubella, chickenpox, cytomegalovirus, herpes simplex virus, EBV) but some bacteria also add to the list (Campylobacter, Chlamydia, Legionella, Borreliaburgdorferi, Mycoplasma pneumoniae). Parasites like Plasmodium and Toxoplasma more frequently seen in developing countries [4, 5, 6].

Most probable pathogenesis for autoimmune response is the result of the homology between the triggering factor (infectious agent, vaccine) and the myelin antigen present in the host [5, 6]. The clinical scenario of ADEM includes general signs such as fever, nausea, vomiting, abdominal discomfort and headache, and neurological signs such as convulsions, altered sensorium, loss of consciousness, focal neurology: hemispheric and/or medullary [7]. Elevated sedimentation rate and leukocyte count is observed in two-thirds of cases. Laboratory investigations must include a complete biochemical, microbiological and hematological panel. CSF studies in ADEM patients often show lymphocyte predominant pleocytosis along with hyperproteinorachia. A cerebral CT scan usually come normal but an cerebral MRI is the gold standard test as it may show predominantly white matter multiple and disseminated lesions [8, 9]. In our case, we established the diagnosis of ADEM with presence of typical lesions in MRI, a positive PCR result in the CSF and in serum IgM for EBV [10]. A wide range must be considered for differential diagnosis as conventional treatment for ADEM (high-dose corticosteroids) should be prescribed with caution. In the management of this clinical condition, priority must be to rule out CNS infection, empiric anti-infective therapy must be considered according to the results. Other differential diagnosis include demyelinating inflammatory CNS diseases, such as multiple sclerosis, isolated clinical syndromes mainly optic neuritis, transverse myelitis, leukoencephalopathies, primary or secondary CNS vasculitis and lymphoma [8]. Till date, there has been no randomised study evaluating the optimal treatment of ADEM, including duration and doses of treatment. The treatment therefore remains empirical, based on mainly high doses of IV corticosteroids (1 g/day) for 3 to 5 days followed by oral administration in tapering doses for 2 to 6 weeks [11]. In the case of resistance or contraindication or poor response of corticosteroids, IV immunoglobulins might be considered at doses of 0.4 g/kg/day. Plasma exchange or Rituximab is a third-line treatment used in cases of refractory forms. EBV encephalomyelitis management should include antiviral therapy, but its efficacy remains uncertain [11, 12]. With the appropriate treatment, more than 50% of patients treated for ADEM respond very well with very good prognostic outcome as in the case hereby presented. Most of patients usually achieved clinical improvement within hours or days after treatment onset. 70% of patients achieve mRS of 2 or less and are able to walk without help 7 months after the onset. The prognosis is more poor in the case of convulsion or disturbance of consciousness at presentation where the mortality rate can reach 25% [4].

Conclusion

Neurological differential in adults should also consider ADEM as well even if it represents a rare condition and MRI should be performed to confirm, as done in the case presented. During etiological evaluation of ADEM EBV also must be kept in mind, as in the case presented. In situation of no response or a partial response to corticosteroids addition of IV immunoglobulins should also be considered.

References

1. Vasseur A, Obadia M, Chardain A, Garcia PY, Giannesini C, Stankoff B. Encéphalomyélite aiguë disséminée et primo-infection par le virus d'Epstein Barr. *Revue Neurologique*,2013:169:A40.
2. Tadmori I, Chaouki S, Abourazzak S, Zahra SF, Benmiloud S, Idrissi ML, *et al*. L'encéphalomyélite aiguë disséminée chez l'enfant. Pan Afr Med J,2014:19:280.
3. Deeba Ali 1, Benoît Cardos 2, Yilmaz Gorur 3, Noel Lorenzo Villalba 4, Nathalie Janssen 1, Carmen Bartha. A Rare Case of Adult Acute Disseminated Encephalomyelitis Associated with Primary Epstein-Barr Virus Infection Doi: 10.12890/2019_001094 - European Journal of Case Reports in Internal Medicine
4. Sonneville R, Demeret S, Klein I, Bouadma L, Mourvillier B, Audibert J *et al*. Acute disseminated encephalomyelitis in the intensive care unit: clinical features and outcome of 20 adults. Intensive Care Med,2008:34:528-532.
5. Ohtake T, Hirai S. Recurrence of acute disseminated encephalomyelitis after a 12-year symptom free interval. Intern Med,2004:43:746-749.
6. Glaser CA, Honarmand S, Anderson LJ, Schnurr DP, Forghani B, Cossen CK *et al*. Beyond viruses: clinical profiles and etiologies associated with encephalitis. Clin Infect Dis,2006:43:1565-1577.
7. Tenembaum S, Chitnis T, Ness J, Hahn JS. Acute disseminated encephalomyelitis. *Neurology*,2007:68:S23–36.
8. Menge T, Hemmer B, Nessler S, Wiendl H, Neuhaus O, Hartung H *et al*. Acute disseminated encephalomyelitis: an update. *Arch Neurol*,2005:62:1673-1680.
9. Dale R. Acute disseminated encephalomyelitis. Semin Pediatr Infect Dis,2003:14:90-95.
10. Garg R. Acute disseminated encephalomyelitis. Postgrad Med, 2003:79:11-17.
11. Schwarz S, Mohr A, Knauth M, Wildemann B, Storch-Hagenlocher B. Acute disseminated encephalomyelitis: a follow-up study of 40 adult patients. *Neurology*,2001:56:1313-1318.

12. Muhammad Saeed, Omar Dabbagh, Muhammad Al-Muhaizae, Hesham Dhalaan, Aziza Chedrawi. Acute Disseminated Encephalomyelitis and Thrombocytopenia Following Epstein-Barr Virus Infection. Journal of the College of Physicians and Surgeons Pakistan, (Special Supplement 3),2014:24:S216-S218.