Infection (2013) 41:727–729
DOI 10.1007/s15010-013-0406-2

CASE REPORT

Stimulus-sensitive myoclonus and cerebellar ataxia following chikungunya meningoencephalitis

J. Kalita · P. Kumar · U. K. Misra

Received: 1 November 2012 / Accepted: 7 January 2013 / Published online: 29 January 2013

Abstract Chikungunya virus was initially thought to be a non-neurotropic virus, but recently neurological complications have been reported in patients with chikungunya virus infection. Here, we report a rare case of stimulus-sensitive myoclonus following chikungunya meningoencephalitis. The cranial MRI scan of the patient was normal, the cerebrospinal fluid contained 200 lymphocytes/mm^3, and the serum immunoglobulin M ELISA was positive for chikungunya. The patient improved completely after 1 month of treatment. This case study illustrates that chikungunya virus should also be considered in a febrile patient with myoclonus, especially in an endemic area.

Keywords Chikungunya · Meningoencephalitis · Cerebellar ataxia · Myoclonus · Movement disorder

Introduction

Chikungunya virus is a RNA virus of the *alphaviridae* group and is considered to be primarily a non-neurotropic virus. However, more recently, there have been an increasing number of reports of neurological complications associated with chikungunya virus infection [1–4]. Chikungunya is a vector-borne disease and prevalent in South East Asia, Africa, Australia, Europe, and India [5–8]. Following the epidemic of chikungunya in the Indian subcontinent in 2005–2006, there was an unexpected outbreak in Northeast Italy and metropolitan France that had been imported from Reunion Island [5, 8]. Chikungunya patients present with fever, headache, backache, myalgia, joint pain, skin rash, and bleeding diathesis. There are anecdotal reports of meningoencephalitis and multi-organ failure in chikungunya patients from India [5]. Among the types of viral encephalitis, Japanese encephalitis is the commonest cause of movement disorder and is endemic in South East Asia, occurring in up to 40 % patients [9]. There is paucity of reports describing stimulus-sensitive myoclonus in chikungunya. In this communication, we report a patient with chikungunya who had stimulus-sensitive myoclonus.

J. Kalita (✉) · P. Kumar · U. K. Misra
Department of Neurology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Raebareily Road, Lucknow 226014, India
e-mail: jayanteek@yahoo.com; jkalita@sgpgi.ac.in

Case report (Cr. No. 2010627921)

A 32-year-old villager from Deoria, Uttar Pradesh, India presented with a 7-day history of fever, diarrhea, and two episodes of generalized tonic–clonic seizures lasting for 5 min. He was referred to our institute due to severe jerks in all four limbs. These movements were aggravated on touch, sound, or movement and subsided during sleep. These abnormal jerky movements severely incapacitated the patient and kept him bed-bound. Upon presentation, the patient was febrile (38 °C), his pulse was 90/min and regular, his blood pressure was 130/90 mmHg, and his respiratory rate was 20/min. There was no lymphadenopathy or hepatosplenomegaly, and his chest and heart were normal. He was drowsy (Glasgow Coma Scale score 14). There was no facial asymmetry, and he was able to move all four limbs equally. He had severe myoclonus (grade IV) which was aggravated by touch, sound, or change in position. He had to be fed by nasogastric tube.

His white cell count was 11,700/mm^3 with 70 % polymorphs, hemoglobin was 9.3 gm/dl, erythrocyte sedimentation rate (ESR) was 20 mm for the first hour, and baseline

platelet count was 125,000/mm^3, increasing to 325,000/mm^3 after 3 weeks. Fasting blood sugar was 82 mg/dl, urea was 20 mg/dl, serum creatinine was 0.9 mg/dl, bilirubin was 1.18 mg/dl, transaminase was210 U/l, sodium was 138 mEq/l, potassium was 3.8 mEq/l, and calcium was 8.9 mg/dl. His chest radiograph was normal, and electroencephalography revealed diffuse slowing without any epileptiform discharge. Serology testing for human immunodeficiency virus, blood smear for malaria parasites, and the immunoglobuin M (IgM) enzyme-linked immunosorbent assay (ELISA) for dengue and leptospira were all negative. The cranial magnetic resonance imaging (MRI) scan was normal, and analysis of the cerebrospinal fluid (CSF) revealed 200 lymphocytes/mm^3 (normal 0–5 cells/mm^3), 24.3 mg/dl of protein (normal 15–45 mg/dl), and 63 mg/dl of glucose (normal 65–95 mg/dl). The CSF was negative for bacteria, acid-fast bacilli, fungi, and cryptococcal antigen. The CSF IgM ELISA for Japanese encephalitis virus and Epstein–Barr virus was negative. His serum IgM ELISA was positive for chikungunya on day 24 of the illness.

The patient was treated with sodium divalproate 500 mg twice daily and clonazepam 0.5 mg three times daily. The severity of myoclonus was reduced on 15 day, but the patient had cerebellar ataxia, as evidenced by an ataxic gait and impaired limb coordination. The patient gradually recovered in 1 month, and at the 3-month follow-up examination he did not have any neurological sequelae.

Discussion

Our patient had with chikungunya had stimulus-sensitive myoclonus and meningoencephalitis. The diagnosis of meningoencephalitis was based on fever, altered sensorium, stimulus-sensitive myoclonus, and lymphocytic pleocytosis of the CSF. The stimulus-sensitive myoclonus in our patient was due to chikungunya as he had serum IgM antibodies against chikungunya and his serum and CSF IgM were negative for other circulating viruses commonly found in this part of India, such as Japanese encephalitis and dengue. It was, however, not possible to test for CSF IgM antibody or perform PCR for chikungunya virus in our patient. Other potential bacterial, viral, and parasitic infections commonly found in the region were excluded. There is paucity of studies on the autopsy findings of chikungunya-associated neurological syndrome; however, in one patient with encephaloradiculitis, brain autopsy revealed edema, ischemic changes, and focal hemorrhages in the cerebral cortex and internal capsule [1]. There were small foci of demyelination in the subcortical white matter, sparse microglial response without formation of glial nodule or neuronophagia, and perivascular lymphocytic infiltration in the basal ganglia [1]. In this case, the correlation of clinical, MRI findings, and histology was consistent with a parainfectious demyelination because the central nervous system manifestations appeared after a few days of fever and arthralgia. The clinical picture of dengue and chikungunya is very similar, and their coexistence has been reported in Madagascar, where in one study ten of 55 patients had coinfection of dengue and chikungunya [10]. Various neurological manifestations, such as encephalopathy, seizures, and focal weakness, have been reported in chikungunya with a frequency of 0.3 % from Thailand [2], 14–16 % from South India [3, 4], and 61 % of hospitalized children from La Reunion Island [11]. It is important to distinguish metabolic encephalopathy from encephalitis in which the CSF will be normal and from post-infectious acute demyelinating neurological deficit, such as acute disseminated encephalomyelopathy, transverse myelitis, optic neuritis, and Guillain–Barre syndrome following chikungunya infection. Post-infectious demyelinating diseases usually occur few weeks after the viral infection and patients with these diseases may test positive for circulating serum IgM antibody, but the absence of fever and CSF antibody or viral DNA/RNA at the time of neurological deficit suggests post-viral immune-mediated neurological deficit. For confirmation of true viral meningoencephalitis due to viral invasion into the central nervous system, the virus needs to be isolated and the patient should test positive for the PCR or IgM antibodies in the CSF. In our patient, the CSF IgM and PCR for chikungunya were not conducted, but other viral markers, such those for dengue and Japanese encephalitis, which are endemic in this part of India, were negative. We took the neurological manifestations in our patient as being due to chikungunya because he developed meningoencephalitis and myoclonus along with the fever, tested positive for IgM antibody against chikungunya, and had CSF pleocytosis. Myoclonus and cerebellar dysfunction have been reported in Epstein–Barr virus encephalitis, West Nile encephalitis, tick-borne encephalitis, mumps, mycoplasma, herpes, and a number of autoimmune encephalitis [12–16]. Stimulus-sensitive myoclonus 3 weeks following chikungunya infection was reported in a 46-year-old woman whose MRI scan revealed cortical atrophy and periventricular white matter T2 hyperintensity [2]. The normal findings on the MRI scan of our patient suggested a lack of severe structural changes, and he recovered completely.

Based on this case study, we suggest that stimulus-sensitive myoclonus in a patient with febrile encephalopathy should raise the awareness of the physician to the possibility of chikungunya, especially in endemic area.

Acknowledgments We acknowledge the Council of Science and Technology, Uttar Pradesh, India for supporting the Encephalitis Research Centre of Excellence. We thank Mr. Rakesh Kumar Nigam for secretarial help.

Conflict of interest None.

Ethics approval The research has been approved by the Institutional Ethics Committee, SGPGIMS, Lucknow.

References

1. Ganesan K, Diwan A, Shankar SK, Desai SB, Sainani GS, Katrak SM. Chikungunya encephalomyeloradiculitis: report of 2 cases with neuroimaging and 1 case with autopsy findings. AJNR Am J Neuroradiol. 2008;29:1636–7.
2. Chusri S, Siripaitoon P, Hirunpat S, Silpapojakul K. Case reports of neuro-Chikungunya in southern Thailand. Am J Trop Med Hyg. 2011;85:386–9.
3. Lewthwaite P, Vasanthapuram R, Osborne JC, Begum A, Plank JL, Shankar MV, Hewson R, Desai A, Beeching NJ, Ravikumar R, Solomon T. Chikungunya virus and central nervous system infections in children, India. Emerg Infect Dis. 2009;15:329–31.
4. Chandak NH, Kashyap RS, Kabra D, Karandikar P, Saha SS, Morey SH, Purohit H,Taori GM, Daginawal HF. Neurological complications of chikungunya virus infection. Neurol India. 2009;57:177–80.
5. Pialoux G, Gaüzère BA, Jauréguiberry S, Strobel M. Chikungunya, an epidemic arbovirosis. Lancet Infect Dis. 2007;7:319–27.
6. World Health Organization. Outbreak news. Wkly Epidemiol Record. 2006;81:105–116.
7. Angelini R, Finarelli A, Angelini P, Po C, Petropulacos K, Macini P, Fiorentini C, Fortuna C, Venturi G, Romi R, Majori G, Nicoletti L, Rezza G, Cassone A. An outbreak of chikungunya fever in the province of Ravenna, Italy. Euro Surveill. 2007;12:E070906.1.
8. Rezza G, Nicoletti L, Angelini R, Romi R, Finarelli AC, Panning M, Cordioli P, Fortuna C, Boros S, Magurano F, Silvi G, Angelini P, Dottori M, Ciufolini MG, Majori GC, Cassone A; CHIKV study group. Infection with Chikungunya virus in Italy: an outbreak in a temperate region. Lancet. 2007;370:1840–6.
9. Misra UK, Kalita J. Spectrum of movement disorders in encephalitis. J Neurol. 2010;257:2052–8.
10. Ratsitorahina M, Harisoa J, Ratovonjato J, Biacabe S, Reynes JM, Zeller H, Raoelina Y, Talarmin A, Richard V, Louis Soares J. Outbreak of dengue and Chikungunya fevers, Toamasina, Madagascar, 2006. Emerg Infect Dis. 2008;14:1135–7.
11. Renault P, Josseran L, Pierre V. Chikungunya-related fatality rates, Mauritius, India, and Reunion Island. Emerg Infect Dis. 2008;14:1327.
12. Karunarathne S, Udayakumara Y, Fernando H. Epstein–Barr virus co-infection in a patient with dengue fever presenting with post-infectious cerebellitis: a case report. J Med Case Rep. 2012;6:43.
13. Duvoisin RC, Yahr MD. Encephalitis and parkinsonism. Arch Neurol (Chicago). 1965;12:227–39.
14. Howard RS, Lees AJ. Encephalitis lethargica: a report of four recent cases. Brain. 1987;110:19–33.
15. Tilley PA, Fox JD, Jayaraman GC, Preiksaitis JK. Maculopapular rash and tremor are associated with West Nile fever and neurological syndromes. J Neurol Neurosurg Psychiatry. 2007;78:529–31.
16. Misić Majerus L, Daković Rode O, Ruzić Sabljić E. Post-encephalitic syndrome in patients with tick-borne encephalitis. Acta Med Croatica. 2009;63:269–78.