Case report

Powasson virus causing tick-borne encephalitis: a diagnostic dilemma

D. ANANTHAN, S. SHAH, H. HASEER-KOYA and A. PATEL

From the SUNY Upstate Medical University, Internal medicine department, Syracuse, NY 13210

Address correspondence to Dinesh Ananthan, MD, SUNY Upstate Medical University, 750 E. Adams Street, Syracuse, NY 13210. email: ananthad@upstate.edu

Learning Point for Clinicians

We strongly recommend that when patients present with encephalitis with a history suggestive of contact with ticks, POWV must be included in the differential diagnosis, especially if they have thalamus/midbrain or cerebellar symptoms.

Introduction

Powassan virus (POWV) is an extremely rare tick-borne agent causing encephalitis in North America. Although only 40 cases have been reported from 1958 to 2000, its virulence in humans appears to be increasing, resulting in severe neurological consequences and mortality.

Case presentation

A 44-year-old afebrile male presented with severe occipital headaches associated with nausea and vomiting for 4 days after a hiking trip in Upstate New York. Vital signs and physical exam were normal. Laboratory studies revealed a leukocytosis of 12.4 (k/Ul), high sensitive C-reactive protein was within normal range (2.2 mg/l) and estimated sedimentation rate was slightly elevated at 24 mm/h. On suspicion of meningitis, he was initially started on acyclovir, ceftriaxone and vancomycin. CSF (cerebral spinal fluid) analysis of a lumbar puncture revealed a white blood cell count of 630 (mg/dl) with a monocytic predominance (18%) suggesting a viral syndrome. Investigation into tick-borne encephalitis including Lyme, Babesiosis and Erlichia serology were negative as were PCR (polymerase chain reaction) analysis for Cryptococcus, HSV 1 and 2, enterovirus. Further blood and CSF cultures as well as rheumatological autoantibody testing including HIV were negative. Radiologically, a computed tomography maxillofacial scan was normal and magnetic resonance imaging of the brain revealed no leptomeningal enhancement. A New York State Health Department encephalitis panel sent at the time of CSF analysis revealed Powasson E polyvalent microsphere immunofluorescence assay to be reactive. Antibiotics at this time were discontinued and the patient was treated conservatively. The patient made a full recovery within 2 weeks.

Discussion

Our case describes a fortunate survivor of POWV encephalitis, a diagnosis that is rarely considered. It is a tick-borne member of flaviviridae group, and its seroprevalance in humans is 5.8% in Canada and 0.7% in New York State. Common reservoirs include mammals such as woodchucks, white-footed mice and species of ticks such as Ixodes. Symptomatically, patients present with encephalitis 1–4 weeks after a tick bite, with fever and headache lasting 1–3 days. Severe
complications range from mental status changes, cerebellar symptoms to hemiplegia, which is the most common neurological sequelae. There have also been reports of bilateral brain hemorrhaging as well involving the thalamic regions. Pathogenesis involves lymphocytic infiltration of the perivascular neuronal tissue of the gray matter targeting the midbrain, thalamus and cerebellum. Diagnosis is made with PCR and serologic testing of CSF, however, the latter is preferred as POWV PCRs are not validated and are widely unavailable. However, CSF PCR for POWV may be negative, especially if patients seek care later in their clinical course. In most cases, the presence of pleocytosis with an elevated CSF protein concentration and POWV-specific immunoglobulin M in CSF suggests neuroinvasion. Ultimately however, the biggest obstacle is the lack of suspicion from the disease that makes diagnosis elusive. Treatment involves supportive care, therefore, physicians should inform endemic patients to take tick prevention strategies such as high boots and avoiding endemic areas if possible. A European vaccine against tick-borne encephalitis virus is available, although its efficacy remains unknown for infection with POWV. Prognosis in terms of mortality rates is as high as 10% with 50% having long-term neurological sequelae.

Conflict of interest: None declared.

References