Herpes Simplex Virus Encephalitis: An Unexpected Outcome in a Polytrauma Patient

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ABSTRACT

An 84-year male was brought in the emergency after a road traffic accident leading to polytrauma with deteriorating consciousness. Prolonged unexplained unconsciousness led to cerebrospinal fluid examination. The polymerase chain reaction (PCR) of cerebrospinal fluid (CSF) was found to be positive for HSV-1 DNA. The patient was started on intravenous acyclovir and the consciousness level of the patient improved gradually. In this case, encephalitis was not suspected initially, because of the multiple traumatic injuries that needed management. Moreover, no features suggestive of encephalitis were present at the time of presentation, except for the non-specific symptom of drowsiness at the time of the accident. The patient was also diabetic and had chronic kidney disease as predisposing factors. It was primarily encephalitis which led to impaired consciousness that resulted in the road traffic accident in a very unlikely situation, *i.e.*, hit by an ambulance inside the hospital. The reasons to suspect herpes simplex virus encephalitis (HSE) in this case were unexplained worsening level of consciousness, CSF findings suggestive of viral encephalitis along with highly deranged alanine aminotransferase (ALT) levels. This case highlights the importance of keeping a high index of suspicion for viral encephalitis in patients with risk factors, even in such a scenario of polytrauma.

Key Words: *Herpes simplex virus, Polytrauma, Viral encephalitis, Polymerase chain reaction.*

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INTRODUCTION

Herpes simplex virus encephalitis (HSE) is considered to be the most common viral encephalitis in immunocompetent patients with significant morbidity and mortality.[1] Rapid and accurate diagnosis is essential for its optimal management. Clinical manifestations, imaging studies, and cerebrospinal fluid (CSF) analysis are the basis of the diagnostic approaches in encephalitis. The application of polymerase chain reaction (PCR) has allowed for the prompt and specific diagnosis of HSE.[2]

We present an unexpected case of HSE in a patient which polytrauma, highlighting the importance of keeping a high index of suspicion for viral encephalitis in patients with risk factors, even in such scenarios.

CASE REPORT

An 84-year male was brought in the emergency department of a tertiary care hospital after a road traffic accident (RTA) leading to polytrauma. According to the eyewitnesses, he was hit by a vehicle while crossing the road.

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The patient was a known case of diabetes mellitus, chronic kidney disease (CKD) and hypertension. He told that he had a feeling of dizziness while crossing the road that resulted in the accident. On general physical examination, the patient was drowsy but arousable with a Glasgow Coma Scale (GCS) score of 13/15. Local examination showed a few clots of blood in both nares, right periorbital oedema, fracture of the right maxilla, intraoral hematoma, scalp bleed with hematoma and fracture of right rib with pneumothorax. CT scan brain revealed multiple fractures and a focal rounded hyperdense lesion in the subcutaneous tissue, soft tissue swelling, with prominent intra-axial and extra-axial CSF spaces.

Later on, the patient gradually became more irritable and restless but had no focal neurological deficit. His condition further deteriorated during the next 4-5 days, and he became unconscious with a GCS of 4/15. He was then put on mechanical ventilation in the intensive care unit (ICU). The patient's alanine aminotransferase (ALT) level was found to be raised (109 IU/L), and on 10th day of admission, it reached the peak level of 886 IU/L. Serological tests for hepatitis B and hepatitis C viruses were negative. To evaluate for the prolonged, unexplained unconsciousness and the suspected liver damage, a lumbar puncture (LP) was done. CSF routine examination and bacterial culture were unremarkable. Some other common viral causes of hepatitis were also ruled out including hepatitis A, hepatitis E and Cytomegalovirus (CMV). Due to deteriorating consciousness and high ALT levels, LP was done again and the CSF sample was sent for HSV DNA PCR testing. HSV I/IITyping PCR was performed

(Sacace Biotechnologies, Italy) which was found to be positive for HSV-1 DNA.

The patient was started on intravenous acyclovir, 750 mg, 8 hourly and the consciousness level of the patient improved gradually. The encephalitis resolved after 10 days of therapy and the patient was taken off the ventilator. PCR for HSV DNA was repeated at the end of treatment with acyclovir, which turned out to be negative. The GCS of the patient improved to 13/15 and he was then shifted to the surgical ward for further management of polytrauma with which he was initially admitted.

DISCUSSION

HSE is an acute infectious disease of the central nervous system (CNS). Its incidence is on the rise over the last 20 years and the mortality rate is 7% if diagnosed and treated early and promptly, and 70% if left untreated.[3,4] The encephalitis is thought to result from the centripetal spread of the reactivated virus from cranial nerve ganglia to the brain. This mechanism is not very well understood and may be facilitated by certain stress factors, trauma, and immunosuppression. In this case, the patient had all of these predisposing factors, that may have resulted in the rapidly deteriorating condition of the patient.

The clinical presentation does not distinguish HSE from encephalitis caused by other viruses such as Epstein-Barr virus (EBV), CMV, Varicella Zoster Virus (VZV), HHV-6, adenovirus or Mycobacterium tuberculosis meningitis. Culture of HSV from the CSF of adults with HSE has very low sensitivity. Better results are obtained with tests that measure HSV antigens or antibodies in the CSF; these tests are associated with high sensitivity (75 to 85%) and specificity (60 to 90%).[5]

The "gold standard" for HSE diagnosis remains brain biopsy, with identification of HSV in the tissue by cell culture or immunohistochemical staining. Although brain biopsy has a sensitivity of 99% and a specificity of 100%, there is a requirement for an invasive procedure and it may take several days for results to be available. Because of these limitations, CSF PCR testing is a valuable diagnostic tool for HSE. It is rapid and associated with very high sensitivity and specificity.[5]

In this case, the HSE was not suspected initially, because of multiple traumatic injuries that needed management and no features suggestive of encephalitis were present at the time of presentation except for the non-specific symptom of drowsiness at the time of the accident. The patient was also diabetic and had CKD as predisposing factors. It was primarily encephalitis which led to impaired consciousness level that resulted in RTA in a very unlikely situation *i.e.,* hit by an ambulance inside the hospital. The reasons to suspect HSE, in this case, were the unexplained worsening level of consciousness, CSF findings suggestive of viral encephalitis along with highly deranged ALT levels. Thus, in such situations, the diagnosis of HSE should be considered.

This case highlights the importance of keeping a high index of suspicion for viral encephalitis in patients with risk factors, even in such a scenario of polytrauma. As HSE is a leading cause of viral encephalitis, especially in patients with CNS signs, CSF findings suggestive of viral encephalitis and hepatitis, making an early diagnosis and starting prompt treatment with antiviral medicines is key to a better prognosis in such patients.

PATIENT'S CONSENT:

Informed consent was taken from the patient for publication of this case.

COMPETING INTEREST:

The authors declared no competing interest.

AUTHORS' CONTRIBUTION:

MS: Conception of work, data acquisition, analysis, and drafting of the manuscript.
SKN: Conception of work, critical revision of draft, and data analysis.
IAM: Data interpretation, critical revision, and final approval of the draft.
WH: Data analysis and critical revision of the draft.
MN, AI: Data analysis and drafting of the manuscript.
All the authors have approved the final version of the manuscript.

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