Herpes simplex encephalitis following microvascular decompression for trigeminal neuralgia

Case report

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The authors present the first reported case of herpes simplex encephalitis (HSE) precipitated by trigeminal nerve microvascular decompression (MVD). The presentation of this specific case together with the pathogenesis and management of HSE are discussed, with a relevant literature review.

Although this disease is rare, to avoid a delay in antiviral treatment the authors suggest that HSE should be considered in any patient presenting with a meningoencephalitic picture following MVD.

Key Words • herpes simplex encephalitis • microvascular decompression • pain
Herpes simplex encephalitis after microvascular decompression

neurological deficit, although she exhibited a positive Kernig sign. There was no wound infection, and a vesicular rash was noted across her torso along the T-4 dermatome distribution.

Treatment. Blood tests revealed leukocytosis with neutrophilia, and monocytosis. Her lymphocyte count was within the normal range and the rest of the blood test results were unremarkable. We suspected that she had postoperative bacterial meningitis in view of her meningitic symptoms and signs. A diagnostic LP was performed and intravenous ceftriaxone and metronidazole were commenced. The results of CSF analysis are shown in Table 1.

Microscopy and culture of CSF samples were negative for bacteria, but HSV-1 was detected in the PCR test of her CSF 48 hours later. Tests for HSV-2, varicella zoster virus, and enterovirus were negative. In view of the new findings, she was commenced on intravenous acyclovir (10 mg/kg) thrice daily for 2 weeks and her antibiotics were stopped.

On further examination of her medical notes, she had had negative results on an HSV serology test 3 years previously as part of a workup to rule out any gynecological cause of abdominal pain. Her HIV test was also negative. On further questioning, she admitted to suffering from cold sores intermittently in the past 2 years.

Posttreatment Course. The patient responded well to treatment; she completed a 2-week course of antiviral drugs and was discharged. A CT head scan demonstrated postsurgical changes at the site of the craniotomy. An MRI study confirmed that there was no focal brain abnormality in the insular region, and the FLAIR sequence demonstrated subtle changes in the medial temporal lobe structures (Fig. 1). The EEG study, however, showed persistent focal slowing over the left frontotemporal area, signs suggestive of focal encephalopathy (Fig. 2).

Discussion

Encephalitis is the inflammation of the brain parenchyma, with HSV-1 the most common causative organism in the West. It carries a high mortality rate unless treatment is initiated promptly. Encephalitis usually presents with a constellation of clinical features such as fever, altered mental status, severe headaches, nausea, and vomiting as well as seizures. Common impairments of mental functions include disorientation, speech disturbances, and behavioral changes. It is important to note that the Glasgow Coma Scale score can be normal at presentation. There is often a potential overlap of clinical features in patients with suspected encephalitis and suspected meningitis or both (meningoencephalitis), because an active CNS viral infection can result in meningeal irritation and disruption of brain parenchyma function. Nevertheless, subsequent investigations and initial management are very similar. The fact that our patient had a positive PCR (which is 99% specific for HSE), negative Gram stain, negative CSF and blood cultures for bacteria, a lack of response to broad-spectrum antibiotics, a fast response to antiviral therapy, and slowing of EEG activity supports the diagnosis of HSE rather than meningitis.

Previous studies have shown that latent HSV reactivation is not uncommon after neurosurgical TN decompression, with a positive HSV culture from oropharyngeal secretions and throat wash in up to 50% of patients. Cutaneous herpetic lesions were reported in 38%–94% of patients after TN decompression. Surgical manipulation of cranial nerves is most likely the etiology behind reactivation of latent HSV-1 in these patients. A histo-

<table>
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<th>Investigation</th>
<th>1st Admission</th>
<th>2nd Admission</th>
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<tr>
<td>glucose in CSF (mmol/L)</td>
<td>2.1</td>
<td>—</td>
</tr>
<tr>
<td>glucose in serum (mmol/L)</td>
<td>5.5</td>
<td>—</td>
</tr>
<tr>
<td>protein (mg/L)</td>
<td>1133</td>
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<td>white blood cells</td>
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<td>red blood cells</td>
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<td>4</td>
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<tr>
<td>lactate</td>
<td>5.2</td>
<td>—</td>
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</tr>
<tr>
<td>HSV-1</td>
<td>detected</td>
<td>not detected</td>
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* — = not measured.
of recurrent herpes labialis infection is also associated with an increased risk of reactivation postoperatively. Prophylactic acyclovir has been shown to possibly reduce the incidence of reactivation. Although reactivation of latent HSV is a frequent complication, especially after MVD, there were no reported cases of HSE as a result of viral reactivation. For this particular case of HSE, it may be more than just simply a reactivation of latent HSV-1, but also perhaps an underlying immunodeficiency disorder, thus increasing the risk of developing encephalitis. Our patient underwent extensive investigations including complete blood count, immunoglobulin, and complement levels, and she did not have immune deficiency.

Evidence-based guidelines on management of viral encephalitis have been published in recent years. The gold standard method of diagnosis formerly was a brain biopsy; however with the advent of modern viral PCR, the choice of investigation would be a diagnostic LP for CSF analysis, provided that there are no contraindications to LP. This should be performed as soon as the patient is stable, ideally before initiating any antibiotic or antiviral drugs. In suspected viral encephalitis, CSF samples should be tested for HSV-1, HSV-2, varicella zoster virus, and enterovirus, because these would identify 90% of cases of viral pathogens. The PCR test has a sensitivity and specificity of 96% and 99%, respectively, when performed between 48 hours and 10 days from onset of symptoms, even after antiviral drugs have been commenced. Patients should be started on intravenous acyclovir (10 mg/kg 3 times daily) once initial CSF analysis has indicated a viral infection or if there is any contraindication or delay (> 6 hours) in performing an LP. Recommended duration of treatment is 14–21 days. Steroids are currently not recommended until results of an ongoing randomized trial prove otherwise.

Other investigative modalities include MRI because it has higher sensitivity than CT in detecting HSE, although CT scans are often performed initially due to the acute nature of presentation. An EEG study can be a useful investigation. Typical EEG abnormalities in encephalitis include slowing of background activity with periodic localized delta discharges, especially in the temporal lobe, although these are not pathognomonic of HSE.

Conclusions

This is the first reported case of HSE following MVD for TN. This is an extremely rare complication, despite studies showing that the rate of latent reactivation of HSV can be very high following neurosurgical procedures. Although HSE is rare and its presenting features might resemble meningitis, there should be a low threshold for suspecting HSE because prompt treatment in the form of intravenous acyclovir can prevent an otherwise fatal condition.

Disclosure

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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