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Post-operative Herpes simplex virus encephalitis after surgical resection of acoustic neuroma: a case report

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Abstract

Herpes simplex virus (HSV) encephalitis is a life-threatening consequence of HSV infection of the central nervous system. Although HSV encephalitis is rare, mortality rates reach 70 per cent in the absence of therapy and only a minority of individuals return to normal function. Antiviral therapy is most effective when started early, necessitating prompt diagnosis.

A case of atypical HSV encephalitis is reported. The appearance of a strong headache followed by impairment of consciousness and hypertone of arms and legs complicated the post-operative course in a 33-year-old patient who underwent surgical removal of an acoustic neuroma. Several brain magnetic resonance imaging (MRI) and computed tomography scans performed in the first week after onset of symptoms of infection did not establish a proper diagnosis. Diffusion-weighted MRI detected brain abnormalities on the fourth day after onset of symptoms, and polymerase chain reaction identification of HSV 1 DNA confirmed the diagnosis. A positive prognosis was achieved due to the decision to start specific, high-dose antiviral therapy based on clinical suspicion, before a firm diagnosis was established.

Key words: Herpes Simplex; Encephalitis; Acoustic Neuroma

Introduction

The annual estimated incidence of Herpes simplex virus (HSV) encephalitis is one to four cases per million population, and it is the most common nonepidemic cause of viral encephalitis in immunocompetent patients.[1] To date, HSV encephalitis complicating the early post-operative course following removal of an acoustic neuroma has not been reported in the literature.

Herpes simplex virus is also the most common cause of sporadic encephalitis throughout the world due to centripetal spread of reactivated virus from cranial nerve ganglia to the brain.

Three possible mechanisms are proposed[2] to explain reactivation of HSV in the central nervous system (CNS): (1) reactivation of dormant viral elements located in the sensory ganglia, particularly in the trigeminal nerve ganglion; (2) central spread of a nasal viral infection via the olfactory nerves; and (3) reactivation of latent CNS infection.

Several risk factors for viral infection reactivation have been proposed:[3] steroids, radiotherapy, trauma, immunosuppression and stress. Even with adequate treatment, HSV encephalitis infection is associated with a mortality rate of 40 per cent and with a very high incidence of subsequent neurological abnormality among survivors.

We present a case report of atypical HSV encephalitis occurring after surgical removal of an acoustic neuroma, in which early diagnosis and treatment enabled a positive outcome.

Case report

A 33-year-old man was admitted to the ENT clinic of the 'La Sapienza' University of Rome for removal of a right acoustic neuroma. The patient's past medical history (18 months previously) was characterized by right progressive sensorineural hearing loss, tinnitus and dizziness. At the time of admission, the patient had a right pantonal threshold shift of 75 dBHL of hearing loss; the vestibular examination showed a right labyrinthine hyporeflexia with spontaneous nystagmus (third-degree, left-beating) that was reduced by fixation. The neurological assessment ruled out any trigeminal nerve involvement.

Brain magnetic resonance imaging (MRI) detected a 28×33 mm soft-tissue mass in the right cerebellopontine angle.

The patient underwent uneventful tumour resection via a translabyrinthine approach and was then moved to the intensive therapy unit for 24 hours. Post-surgical therapy was: ceftriaxone 2 g twice daily, chloramphenicol 500 mg three times daily, ranitidine 300 mg twice daily, intravenous mannitol 18 per cent 100 cc twice daily and betametasone 4 mg twice daily.

Immediately after surgery, a 4/6 (House-Brackman grading) degree of facial palsy was evident. On the second post-operative day, the patient reported moderate headache and aesthenia and his body temperature was 37°C. A blood count showed neutrophilic leukocytosis (23 000 cells/ml) and antibiotic therapy was continued without change. On the seventh post-operative day, the patient complained of a significant worsening of his headache. Brain computed tomography (CT) and MRI

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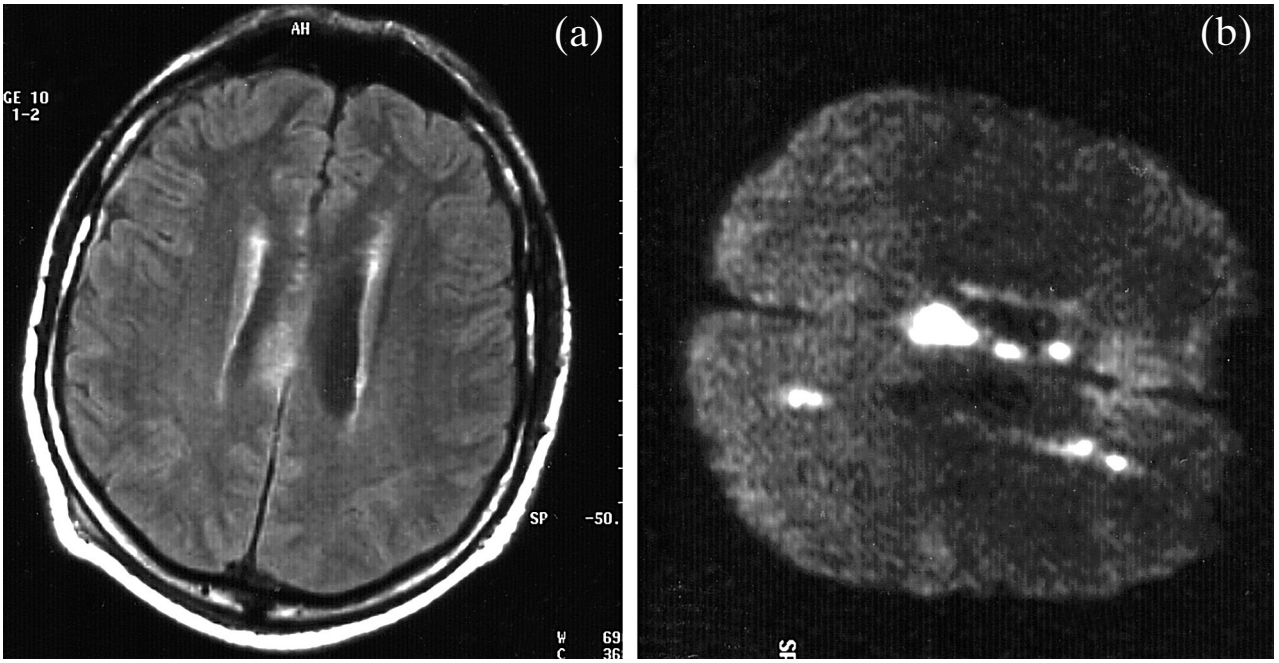

FIG. 1

Magnetic resonance imaging showing hyperintensities at the level of the corpus callosum and corona radiata in (a) FLAIR and (b) diffusion-weighted sequences.

scans performed the next day did not detect any significant abnormalities in the brain parenchyma. Ten days after surgery, corresponding to the eighth day after onset of the headache, the patient suddenly developed difficulty talking, somnolence, impairment of consciousness, and hypertone of arms and legs. The body temperature rose to 37.7°C and a new blood count showed 20 000/ml leukocytes with a normal differential.

Conventional MRI performed on the 11th post-operative day was negative, whereas fluid-attenuated inversion recovery (FLAIR) and diffusion-weighted sequences showed hyperintensities at the level of the corpus callosum and corona radiata (Figure 1).

Due to suspicion of viral infection, the medical treatment was modified and the patient was commenced on antiviral therapy with high-dose aciclovir (750 mg three times daily intravenous).

A lumbar puncture was performed which detected a slight cerebrospinal fluid (CSF) pleocytosis with 39 cells/ml (28 per cent neutrophils, 32 per cent lymphocytes and 45 per cent monocytes), a normal glucose level (53 mg/dl) and an increased protein level (84.4 mg/dl, with normal rate 15.0–45.0 mg/dl). All bacteriological and fungal cultures of CSF samples obtained during the lumbar puncture were negative, but the results of CSF polymerase chain reaction (PCR) for HSV DNA were positive for HSV type 1 DNA. Finally, brain MRI on the 15th post-operative day showed hyperintense regions of different sizes in multiple areas involving the corpus callosum and corona radiata, associated with bilateral gyral oedema (Figure 2). Based on these findings, the diagnosis of HSV encephalitis was made. The patient underwent therapy for one month and was discharged in good clinical condition. MRI performed three months later excluded the presence of residual infection.

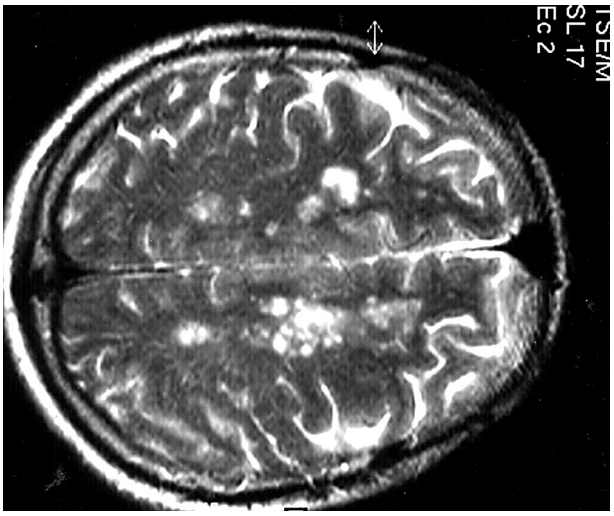

FIG. 2

Magnetic resonance imaging showing multiple hyperintense areas of different sizes involving the corpus callosum and corona radiata, associated with bilateral gyral oedema.

Discussion

Herpes simplex viral encephalitis as a complication of resection of acoustic neuroma has never been described previously, although a cutaneous reactivation of HSV has been reported after manipulation of the facial nerve during surgery for acoustic neuroma.[4] In addition, two cases in which fatal HSV encephalitis occurred after a neurosurgical procedure for a high-grade glioma[3] and a meningioma[1] have recently been published.

The diagnosis of post-operative HSV encephalitis is difficult because its clinical features can mimic other, more common post-operative complications. Usually, high fever, impairment of consciousness and seizures are the most frequent clinical signs but they are not specific. Brain MRI is the most sensitive imaging modality to detect encephalitis-related cortical changes, especially T2-weighted and FLAIR sequences. In our patient's MRI, the distribution of cortical lesions (high-intensity signals) shows the well known affinity of HSV for the grey matter of the limbic system.

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Our patient's case displayed many variations from the typical manifestation of HSV encephalitis. The body temperature never reached 38°C, seizures were not present, and conventional MRI did detect diffusion abnormalities at the level of the corona radiata and the corpus callosum but only one week after onset of the infection.

- **This report documents the clinical course and treatment of a patient developing Herpes simplex virus encephalitis after acoustic neuroma removal**
- **Diagnosis was by diffusion-weighted MRI and identification of HSV DNA**
- **Treatment was with high-dose antiviral therapy**

According to a very recent study,[5] diffusion-weighted MRI should be considered a valuable tool for early detection and diagnosis of HSV encephalitis, whereas contrast-enhanced images are indispensable after the first week.

Polymerase chain reaction identification of HSV 1 DNA has simplified the diagnosis of HSV encephalitis because this method is rapid, sensitive and specific for initial diagnosis and disease monitoring.[3] In our patient, the diagnosis of HSV encephalitis was confirmed by the PCR result; however, a positive prognosis was achieved by the decision to start specific, high-dose antiviral therapy based on clinical suspicion, before a firm diagnosis had been established.

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