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Case Report

Herpes Simplex Virus Type 2 Encephalitis with Herpes Simplex Virus Type 1 MRI Findings in an Immunocompetent Adult

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Abstract

Infectious encephalitis is a common cause of acute altered mental status in adults. Most cases of viral encephalitis are often from Herpes Simplex Virus (HSV)-1 and are commonly associated with specific MRI findings that include temporal lobe changes. HSV-2 associated encephalitis is however remarkably rare. Even in HSV-2 encephalitis cases, MRI findings of temporal lobe changes are not typical. We present the case of a patient who presented with classic MRI findings, but was found to have PCR confirmed HSV-2 associated encephalitis. We discuss and hypothesize mechanisms by which HSV gains access to CNS and the reason behind increasing cases of HSV-2 associated encephalitis.

Keywords: HSV; Encephalitis; Temporal Lobe; Infectious Encephalitis; Herpes Simplex Virus

Introduction

Encephalitis refers to any inflammation of the brain tissue. Depending on the location and the extent of brain tissue involved, symptoms can vary from sensory deficits alone to a comatose state. The most common cause of acute encephalitis is infection. Studies estimate approximately 20,000 hospital admissions each year in the US due to encephalitis; 20% of these are attributed HSV encephalitis [1,2]. MRI findings of hyperintensities in the temporal lobes have been considered pathognomonic for HSV-1 encephalitis in non-immunocompromised adults. However, such neuro-imaging changes on MRI in patients with HSV-2 encephalitis is extremely rare. We present a rare case of HSV-2 encephalitis in our patient with temporal lobe findings on MRI.

Case Report

Patient is a 69-year-old female with a past medical history of essential HTN, dyslipidemia and "meningitis" who presented with altered mental status. She did not have any reported neck stiffness or fevers. Patient was oriented to person only. CT head and CTA head/neck did not show any acute abnormalities. MRI revealed hyper-intensities in bilateral temporal lobes as noted in figure below.

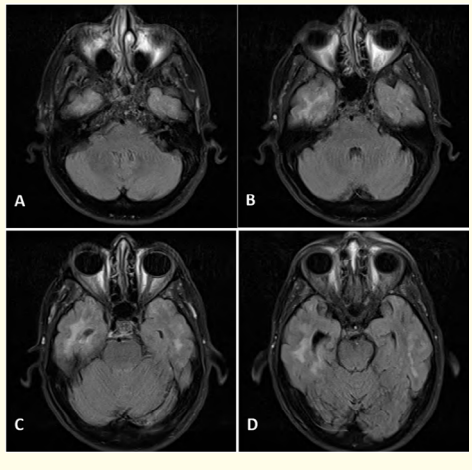

Figure 1: A-D showing different cuts of MRI showing bilateral temporal hyperintensities on T2 Flair.

Lumbar puncture showed WBC count elevation with 96% lymphocytes, protein 197, and glucose 89. The patient's lumbar puncture results, compared to bacterial and viral meningitis is shown in the table below.

	Bacterial	Viral	Our patient
WBC predominance	Neutrophilic	Lymphocytic	Lymphocytic
Protein concentration	>200mg/dL	<150mg/dL	147
Glucose	<50% of blood concentration	>50% of blood concentration	60% of blood concentration

Table 1: CSF findings in bacterial meningitis vs viral encephalitis vs our patient.

Gram stain of the CSF was negative. CSF fluid PCR was positive for HSV- 2. Patient was subsequently started on acyclovir and her mentation improved after 5 days.

Discussion

Herpes simplex encephalitis (HSE) is a neurological emergency and is the most frequent cause of sporadic fatal encephalitis in the USA. Without treatment, the overall mortality of HSE approaches almost 70% [3]. HSV-2 encephalitis is relatively rare and accounts for only 2% of all HSE cases. HSV-2 related CNS infections typically present as a recurrent meningitis, "Mollaret's Meningitis" [4]. Current medical practice for diagnosis includes a multi-centered approach including MRI and CSF analysis with PCR. Typical lumbar puncture findings associated with HSE include elevated WBC's with lymphocytic predominance, increased protein concentration with moderately low to normal glucose values.

The CSF findings for our patient were consistent with viral encephalitis. The CSF PCR demonstrated HSV-2 as noted in table 1. CSF PCR for herpes virus is highly sensitive and specific. It remains the standard for diagnosing HSE. However, there have been rare reported cases of false negative PCR results [5,6]. In such cases, MRI findings along with high clinical suspicion lead to the treatment of these patients with acyclovir and subsequent resolution of their symptoms. For this reason, it is standard practice to obtain MRI, lumbar puncture and CSF PCR in patients suspected with HSE.

Abnormal MRI findings are noted in more than 90% of the patients with HSV-1 encephalitis [7]. Findings associated with HSV-1 encephalitis are asymmetric FLAIR hyperintensities corresponding to edematous changes in the gray matter of the mesial temporal lobes, inferior frontal lobes, and insula [7]. However, in HSV-2 encephalitis, such MRI findings are not typical [8-12]. Due to the rare incidence of HSV-2 encephalitis, studies are minimal at best. Case reports have documented HSV-2 encephalitis cases without any neuroimaging findings. The temporal lobe involvement noted in Figure 1 is typical of HSV-1 cases. However, our patient's CSF PCR confirmed HSV-2. Repeat lumbar puncture CSF PCR five days after treatment with acyclovir was negative for HSV-2. Patient's mentation returned to normal.

The exact mechanism by which HSV-1 and HSV-2 cause such profound changes in mentation is not fully understood. Herpesvirus are double-stranded DNA that are well adapted to survive in the human body and can be readily transmitted between humans. The initial infection with HSV is thought to be from breakdown of the mucosal skin surface. Although the exact mechanism is unclear, the virus has been hypothesized to gain access to the CNS via the olfactory or trigeminal nerves, where it can remain latent [13]. The virus then gets reactivated when the body undergoes stress with events such as fever, local trauma, physical or emotional stress, exposure to ultraviolet light, hormonal imbalance, or immunosuppression.

Historically, HSV-1 had been primarily associated with oral herpes while HSV-2 was the primary cause of genital herpes. Recent studies have shown that orofacial lesions can be caused by HSV-1 and HSV-2 [14]. As the incidence of HSV-2 associated oral lesions increase, we hypothesize that the number of HSV-2 encephalitis will also likely increase. We also theorize that the lack of MRI findings noted in cases with HSV-2 could be related to the overall decreased incidence of HSV-2 encephalitis. As the incidence of HSV-2 encephalitis cases increase, temporal lobe changes on MRI may become a common finding associated with HSV-2 encephalitis.

Conclusion

In conclusion, we present the rare case of a patient who presented with altered mental status secondary to HSV-2 encephalitis and was found to have MRI changes that are typically associated with HSV-1 encephalitis. We propose that the increasing incidence

of HSV-2 associated oral herpes as the likely culprit of increasing cases of HSV-2 encephalitis.

Bibliography

1. Boucher A., *et al*. "Epidemiology of infectious encephalitis causes in 2016". *Medecine et Maladies Infectieuses* 47.3 (2017): 221-235.

2. Asnis D and Niazi N. "Nondominant hemisphere encephalitis in patient with signs of viral meningitis, New York, USA" (2009).

3. Jouan Y., *et al*. "Long-term outcome of severe herpes simplex encephalitis: a population-based observational study". *Critical Care* 19.1 (2015): 345.

4. Wright W F., *et al*. "Mollaret meningitis". *Journal of the Neurological Sciences* 396 (2019): 148-149.

5. Adler A C., *et al*. "Herpes simplex encephalitis with two false-negative cerebrospinal fluid PCR tests and review of negative PCR results in the clinical setting". *Case Reports in Neurology* 3.2 (2011): 172-178.

6. Schuster S., *et al*. "Fatal PCR-negative herpes simplex virus-1 encephalitis with GABAA receptor antibodies". *Neurology-Neuroimmunology Neuroinflammation* 6.6 (2019).

7. Tyler K L. "Update on herpes simplex encephalitis". *Reviews in Neurological Diseases* 1.4 (2004): 169-178.

8. Jayaraman K., *et al*. "Magnetic resonance imaging findings in viral encephalitis: A pictorial essay". *Journal of Neurosciences in Rural Practice* 9.4 (2018): 556-560.

9. McCabe K., *et al*. "Diffusion-weighted MRI abnormalities as a clue to the diagnosis of herpes simplex encephalitis". *Neurology* 61.7 (2003): 1015-1015.

10. Dennett C., *et al*. "HSV-1 and HSV-2 in herpes simplex encephalitis: A study of sixty-four cases in the United Kingdom". *Journal of Medical Virology* 53.1 (1997): 1-3.

11. Zis P., *et al*. "Herpes simplex virus type 2 encephalitis as a cause of ischemic stroke: case report and systematic review of the literature". *Journal of Stroke and Cerebrovascular Diseases* 25.2 (2016): 335-339.

12. Tang J W., *et al*. "Brain stem encephalitis caused by primary herpes simplex 2 infection in a young woman". *Journal of Neurology, Neurosurgery and Psychiatry* 74.9 (2003): 1323-1325.

13. Bradshaw M J and Venkatesan A. "Herpes simplex virus-1 encephalitis in adults: pathophysiology, diagnosis, and management". *Neurotherapeutics* 13.3 (2016): 493-508.

14. Crimi S., *et al*. "Herpes Virus, Oral Clinical Signs and QoL: Systematic Review of Recent Data". *Viruses* 11.5 (2019): 463.

Volume 4 Issue 6 June 2021