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Clinical Case

Atypical HSV-2 Meningoencephalitis in an Immunocompetent Patient: A Case Report

Angela Ghiletchi *[1], Carolina Coelho [1], Inês Ferreira [1], Inês Fiúza M. Rua [1], Sérgio Cabaço [1], Wendy Moniz [1], Rodrigo Nazário Leão [1,2]

[1]Local Health Unit of São José, Lisbon, Portugal.
[2]NOVA Medical School, Lisbon, Portugal.

*Corresponding author: Angela Ghiletchi; *angela.ghiletchi@ulssjose.min-saude.pt*

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Abstract

Herpes simplex virus type 2 (HSV-2) is primarily known for causing genital infections but can occasionally result in central nervous system (CNS) involvement, manifesting as meningitis or meningoencephalitis. HSV-2 meningoencephalitis is a rare, yet potentially severe condition, particularly in immunocompromised patients. We present the case of a 63-year-old immunocompetent woman who developed progressive neurological symptoms, including mental confusion and generalized seizures. Cerebrospinal fluid analysis and polymerase chain reaction (PCR) confirmed HSV-2 infection. Timely initiation of acyclovir led to a favourable outcome, with the patient being discharged after 15 days of antiviral therapy without any lasting neurological sequelae. This case highlights the importance of early recognition and treatment of HSV-2 meningoencephalitis, even in immunocompetent patients, to prevent long-term complications.

Keywords: ***Viral meningoencephalitis; Herpes simplex virus type 2; Central nervous system infection; Acyclovir therapy; Cerebrospinal fluid PCR.***

Introduction

Herpes simplex virus type 2 (HSV-2) is traditionally associated with genital infections; however, it can also cause central nervous system (CNS) infections, leading to conditions such as meningitis or meningoencephalitis. HSV-2 meningoencephalitis is a rare but potentially severe condition, particularly in immunocompromised individuals. Timely recognition and diagnosis are critical for improving patient outcomes as untreated HSV-2 meningoencephalitis can result in significant morbidity and mortality.

HSV-2 typically affects adults and neonates, although adults with compromised immune systems are also susceptible. While herpes simplex virus type 1 (HSV-1) is more commonly associated with encephalitis, HSV-2 predominantly causes meningitis, although cases of HSV-2 encephalitis have been reported [1]. The clinical presentation of HSV-2 CNS infections can vary, making diagnosis challenging. Common symptoms include fever, headache, neck stiffness, and altered mental status [2]. Lumbar puncture remains a cornerstone of diagnosis, with cerebrospinal fluid (CSF) analysis revealing lymphocytic pleocytosis, elevated protein levels, and PCR testing positive for HSV DNA [3].

The prognosis of HSV-2 meningoencephalitis largely depends on the rapid initiation of antiviral therapy, primarily acyclovir. Treatment delays, particularly in immunocompromised patients, are associated with poorer outcomes, including cognitive deficits and neurological sequelae [4]. Furthermore, advances in viral detection techniques, such as multiplex Polymerase Chain Reaction (PCR) panels, have improved diagnostic accuracy, enabling the identification of HSV-2 as an etiological agent even in cases where clinical presentations are atypical [5]. This report aims to present a clinical case of HSV-2 meningoencephalitis, highlighting the diagnostic challenges and clinical management.

Clinical Case

We present the case of a 63-year-old Brazilian woman, having moved to Portugal in the previous month. She presented to the emergency department with nausea, vomiting, and headache of varying intensity with progressive worsening over the course of six days. Her condition worsened with mental confusion, delusional speech, and a generalized tonic-clonic seizure which prompted the hospital visit. The patient did not report fever or any other accompanying symptoms. Her medical history included Essential Hypertension and Depression, for which she was madicated. Upon arrival at the emergency department, she was hypertensive, afebrile and the neurological evaluation revealed time and space disorientation, poor speech, easy distractibility and marked anxiety. Meningeal signs were absent. Computer Tomography (CT) scan of the head with angiography was performed and excluded space-occupying lesions and ischemic or haemorrhagic strokes. The patient was then submitted to cerebrospinal fluid (CSF) analysis which revealed 266 mononuclear cells, protein levels of 195 mg/dL, and a glucose level of 55 mg/dL (70% of the serum's level). Further CSF was tested for neurotropic viruses, bacteria, mycobacteria and

fungus, on a first approach. A diagnosis of meningoencephalitis was assumed requiring brief admission to a level III unit due to fluctuating consciousness. Electroencephalogram revealed diffuse wave slowing, compatible with an encephalopathic state. Empirical therapy was started with ceftriaxone (2 grams every 12 hours) plus ampicillin (2 grams every 4 hours), acyclovir (10 milligrams per kilogram every 8 hours) and dexamethasone (0.15 milligrams per kilogram every 6 hours). A positive PCR test in the CSF for HSV-2 led to the discontinuation of antibiotic therapy and corticosteroids. During hospitalization, the patient presented difficult-to-control hypertension and an episode of closed-angle glaucoma. She was discharged home after 15 days of acyclovir treatment, with no neurological sequelae.

Discussion

HSV-2 meningoencephalitis is a relatively rare and under-recognized form of CNS infection, primarily affecting immunocompromised individuals. In this case, the patient, although not immunocompromised, developed a severe form of meningoencephalitis without classical symptoms such as fever or neck stiffness, presenting a diagnostic challenge. The progressive nature of the symptoms, including confusion, delusional speech, and seizure, underscored the urgency for a comprehensive neurological evaluation. A key diagnostic feature was the lumbar puncture, which revealed a lymphocytic pleocytosis, elevated protein, and normal glucose levels, consistent with viral meningoencephalitis. PCR confirmed HSV-2 as the causative agent.

This case reinforces the need of maintaining a broad differential diagnosis in patients presenting with altered mental status despite no other meningeal or infectious cues. While HSV-1 is more frequently associated with encephalitis, the growing recognition of HSV-2 CNS involvement emphasizes the need for prompt and precise diagnostic tools such as PCR in the cerebrospinal fluid [5].

This case also highlights the critical role of early antiviral therapy with acyclovir. Delayed treatment of HSV meningoencephalitis has been associated with poor outcomes, including permanent cognitive deficits and higher mortality rates [4]. Fortunately, in this case, the rapid initiation of acyclovir led to the resolution of symptoms without neurological sequelae, highlighting the therapeutic benefit of early intervention [2]. Another notable complication was the episode of closed-angle glaucoma, which emerged during hospitalization. While this is an unusual complication, it may be related to the complex interplay between systemic hypertension, stress, and corticosteroid use [1]. The patient's hypertensive crisis during hospitalization also suggests that CNS infections like meningoencephalitis may exacerbate preexisting conditions such as hypertension [1,4].

Conclusions

HSV-2 meningoencephalitis, although rare, should be considered in the differential diagnosis of patients presenting with progressive neurological symptoms, even in the absence of classic signs such as fever or neck stiffness. Lumbar puncture and PCR testing are essential for a definitive diagnosis. Early administration of acyclovir is critical for improving outcomes and minimizing the risk of neurological sequelae. This case demonstrates the importance of prompt recognition, accurate diagnosis, and timely therapeutic intervention in managing HSV-2 meningoencephalitis. It also highlights the need for vigilance in managing concurrent complications, such as hypertension and glaucoma, during the course of the illness.

Declarations

Ethics approval and consent to participate

Consent was obtained by patient of the case report.
Due to the nature of the case report, the Ethics Committee was not involved.

List of abbreviations

HSV-2: Herpes Simplex Virus Type 2
CNS: Central Nervous System
CSF: Cerebrospinal Fluid
PCR: Polymerase Chain Reaction
CT: Computer Tomography
mg/dL - Milligrams per Deciliter
kg - Kilogram

Data Availability

All data is available upon request to the first author.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Funding Statement

Does not apply.

Authors' contributions

AG, CC, IF, IFMR, SC; WM and RNL analysed and interpreted the patient data regarding case presentation and the literature of the case report. AG was largely involved in caring for the patient and acquiring patient data. AG and CC were major contributors in writing the manuscript. RNL was the major contributor in reviewing the medical accuracy and literature relevance of the manuscript. All authors read and approved the final manuscript."

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