

## CASE REPORT

# Acute hsv-2 meningoencephalitis in adults: case report and diagnostic challenges.

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**Abstract-** The gold standard for detecting viral meningitis is the polymerase chain reaction (PCR) of cerebrospinal fluid (CSF). A 36-year-old male patient was diagnosed with HSV-2 meningoencephalitis by the CSF-PCR meningoencephalitis panel (40261). Acyclovir is the preferred treatment for herpes simplex encephalitis, as it is absorbed by virus-infected cells, while healthy cells stay unaffected. Despite all the risk factors of morbidity and mortality, the early antiviral medication will improve the prognosis of patients with HSV-2 meningoencephalitis.

**KEYWORDS:** Meningoencephalitis, HSV-II viral meningoencephalitis, the complication in diagnosis, Acyclovir antiviral treatment.

## BACKGROUND:

Encephalitis is inflammation in the brain parenchyma with neurological dysfunction that can be caused by infectious, non-infectious, or post-infectious causes [1]; meningitis is an inflammatory syndrome of the meninges that is classically manifested with headache and nuchal rigidity; it is diagnosed by CSF examination, depending on the inflammation and swelling. In most cases, there is some concomitant meningeal inflammation in addition to the encephalitic part—a condition commonly referred to as “meningoencephalitis.” Early identification of HSV meningitis is crucial for effective treatment, as it can be challenging to distinguish between meningoencephalitis and meningitis, particularly among youngsters [2]. Identifying HSV meningitis earlier is significant for effective treatment since it can progress to meningoencephalitis [3]. The gold standard for detecting viral meningitis is the polymerase chain reaction (PCR) of cerebrospinal fluid (CSF). False-negative results can occur when CSF samples are obtained too early during encephalitis. Repeated sampling is necessary [4]. However, PCR findings may not be available in emergency departments or hospitals, which may lead to delayed therapy [4]. PCR findings are often accessible to clinicians within 48–72 hours of collection. According to the IDSA guidelines, the cause of sporadic encephalitis increased globally to 5%–10% in all age groups. HSV-1 infection is more prevalent in adults; HSV-2 infection is more common in neonates [5]. This case study is about an adult patient, diagnosed with HSV-2 meningoencephalitis by the CSF-PCR meningoencephalitis panel (40261). Acyclovir is the preferred treatment for herpes simplex encephalitis [6], it is absorbed by virus-infected cells, while healthy cells stay unaffected. The compound is triggered by viral thymidine kinase inside the cell. It inhibits viral DNA and inactivates viral DNA polymerase, resulting in a break in the nucleoside chain and preventing replication without harming normal cells [7, 8]. Early antiviral medication can improve the prognosis of people with HSV-2 meningoencephalitis, but considerable risk of morbidity and mortality is also there. Patients with herpes simplex encephalitis, age (>30 years), level of consciousness (Glasgow coma score, <6), and duration of symptoms before starting acyclovir therapy (14 days) are predictors of an adverse outcome [9]. Initiating therapy before confirmative diagnosis, four days after the appearance of clinical signs, reduced mortality by 8% [10].

## CASE PRESENTATION:

On June 28, 2023, a 36-year-old male patient was presented at emergency care in a tertiary care center, with severe intensive headache, high-grade intermittent fever (108.6°F), and vomiting episodes for the past 5 days with poor oral intake. He was given an antibiotic (ceftriaxone 2g intravenously) for the complaint of fever for about 4 days before his admission, he had no significant medical history. His vital signs showed PR-76 b/m. BP-150/100mmhg Lungs- normal,

the patient was conscious, oriented, and febrile, CVS-S1 S2 (+), CNS-Terminal neck stiffness, P/A-SOFT. The above-mentioned vitals seemed normal except for blood pressure, CNS, and temperature.

On 28.6.2023, the patient's laboratory results show. Serum potassium - Detected value: 33.26 meq/L (Normal range: 3.3 to 5.1 meq/L). Serum chloride - Detected value: 97.1 meq/L (Normal value: 98–106 meq/L). Bilirubin indirect - Detected value: 0.4 mg/dL (Normal value: 0.6–1.0 mg/dl). ALT - Detected value: 41.8 u/L (Normal value: 29– 33 u/L). GAMMA GT - Detected value: 81 u/L (Normal value: 9–72 u/L). On June 28, 2023, an initial MRI was performed, that depicted there is no evidence of intracranial disease. Ceftriaxone was prescribed due to the patient's symptoms, which suggested bacterial meningitis. To cure his vomiting bouts, an injection of ondansetron was administered. A complete MRI of the spine was taken on 30.6.2023. The report exhibited a minor posterior disc herniation indented the t-theal sac at C3/4 and C4/5. The C5/6 posterior disc osteophytes complex indented the cord and caused the bilateral forum to narrow. Minimal posterior disc bulging indenting thecal sac at L4/5 and L5, However, no significant herniation or root compression was seen. Based on the aforementioned MRI results, the patient was diagnosed with meningoencephalitis, but the causing organism was not identified, thus he proceeded with his previous pharmaceutical treatment. The CSF inquiry was also conducted on 30.6.23. The study indicated that no pathogenic organisms were discovered; nevertheless, there was an increase in WBC in the CSF. CSF Gram staining and AFB were also performed. There was an aberrant result that showed only a few pus cells and RBC. The patient had not recovered from his sickness, he was suspected of having viral encephalitis based on IDSA recommendations. On 1.7.23, a meningoencephalitis panel (40261) PCR test was performed. HSVII-DNA was found by this test. After finding the HSVII-DNA, the patient was treated with IV Acyclovir for two days. His health condition was improved; therefore, he was discharged on 2.7.23 and prescribed Acyclovir (500 mg) in 100 mL of NS for 1-hour slow infusion ( $\times 12$  days), a total of 14 days of antiviral medication.

### CASE DISCUSSION:

Encephalitis, or brain inflammation, is primarily caused by a viral infection, specifically the herpes simplex virus type. Five percent to 10% of all cases, this is the major cause of sporadic encephalitis globally of all ages in all seasons. HSV-1 infection is predominant in adults. HSV-2 infection is more common in neonates [5]. Patients often exhibit altered mental status, fever, and seizures. However, there may be unusual movement difficulties or specific neurological anomalies. This patient was admitted with complaints of high-grade intermittent fever for the previous 5 days, a severe headache (new start), vomiting, and a reasonable appetite. The patient's systemic assessment on the first day revealed terminal neck stiffness, showing a specific neurological impairment. This implies that the patient has a CNS problem, even though his CBC is normal. The patient's symptoms suggested a pathogenic infection. RFT figured out that he has a low electrolyte level (sodium and potassium), which could be attributable to dehydration from vomiting. To counteract the emission, the patient received IV ondansetron. On a liver function test, he had high levels of ALT and gamma GT, which indicate serious liver damage, but he was not probed or given any hepatoprotective drugs. Following discharge, the levels of ALT and gamma GT return to normal. As he was suspected of having a CNS problem, an MRI brain scan was performed, which revealed no clear intracranial pathology. Even though no abnormalities were found on magnetic resonance imaging of the brain in our case, MRI is more effective than CT for detecting problems early. MRI has 100% sensitivity for detecting HSV encephalitis alterations within three to ten days of symptom onset, making it a useful tool for eliminating the diagnosis [3]. On the third day of admission, the entire spine was scanned using an MRI. It implies disc herniation in C3/4, C4/5, and the establishment of an osteophyte complex in C5/6. This verifies the patient's CNS infection pathology. The CSF investigation was performed on the same day. The patient's CSF was clear and colorless, indicating viral pathology. However, the protein level indicated bacterial pathology due to the proliferative stage. The patient was started on ceftriaxone (a broad-spectrum antibiotic) instead of IV acyclovir, which is required. On the fourth day, gram staining and AFB staining of CSF were conducted to identify the specific pathogenic bacteria, which were found to be negative. The culture had no bacteria, but the CSF cell cytology was inflammatory. A serological test using CSF meningoencephalitis panel (40261) revealed the presence of HSV-2 DNA virus-induced meningoencephalitis. If the patient had received acyclovir before the differential diagnosis, the efficacy of therapy might be increased; thus, antiviral therapy should be initiated before the differential diagnosis to reduce mortality and increase patient survival rates.

### CONCLUSION:

Virus is the primary cause of encephalitis among children and adolescents. To confirm the diagnosis, epidemiological, clinical, and auxiliary tests must be executed. Empirical antiviral therapy may be prescribed for some viral etiologies until etiologic confirmation is obtained. More research is required to develop new medicines for unmet medical needs, like arboviral and enterovirus infections. Despite a delayed diagnosis, this patient recovered remarkably. To reduce mortality and morbidity rates in HSE, needless delays in diagnosis should be avoided, and acyclovir therapy should be started, even if HSE is merely suspected.

**COMPETING INTERESTS:** The author(s) declare that they have no financial or nonfinancial competing interests.

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**PATIENT CONSENT:** Not Applicable

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