CASE REPORT

Human Herpesvirus 7 and Adenovirus Meningo-encephalitis in an Immunocompetent Child: A Rare Case Report

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ABSTRACT

Encephalitis is characterized by altered mental status and additional neurological criteria. Although commonly linked to herpesviruses, its association with human herpesvirus 7 (HHV-7) and adenovirus in immunocompetent individuals is rare. We present the case of an 11-year-old boy admitted with fever, seizures, and altered level of consciousness. Initial cerebrospinal fluid (CSF) analysis indicated pleocytosis with elevated protein levels. Brain magnetic resonance imaging (MRI) showed mild cortical swelling and hyperintense signals. Neuro PCR identified HHV-7 and adenovirus in the CSF. Empirical treatment with corticosteroids, ceftriaxone, vancomycin, and acyclovir was initiated. As the patient's condition deteriorated, acyclovir was replaced with ganciclovir, resulting in significant neurological improvement. He was discharged with continued recovery over four months. This case highlights the importance of early viral identification and targeted antiviral therapy in encephalitis management. Further research is needed to understand the pathogenic role of HHV-7 and adenovirus in immunocompetent individuals.

Key words: *Human herpesvirus 7, adenovirus, meningoencephalitis, ganciclovir, neuroimaging*

INTRODUCTION

The presence of altered mental status without any other reason and any two of the following minor criteria is what the International Encephalitis Consortium defines encephalitis as: (a) fever 72 hours before or following presentation; (b) new onset focal neurological impairment; (c) new onset seizures; (d) white blood cell count in cerebrospinal fluid (CSF) greater than 5/µL; (e) new lesions on neuroimaging; and (f) abnormal electroencephalography. The following prognostic variables are independently linked to a poor clinical outcome: seizures, Glasgow Coma Scale score <13, and fever. The most common viruses causing encephalitis are herpes simplex virus, varicella-zoster, human immunodeficiency virus, Epstein-Bar virus, cytomegalovirus, Japanese encephalitis, and arboviruses.[1]

A lifetime latent condition with the potential for reactivation in the event of immunodeficiency follows primary infection. Both late primary human herpesvirus 7 (HHV-7) infection and re-ctivation of the virus from macrophages and/or CD4+ T cells can occur; however, little is known about the natural history of this infectious pathogen and the effects of HHV-7 infection in immunocompetent adults. Its harmful effect on central nervous system (CNS) disorders in people who are not immunosuppressed is particularly poorly understood. For the purpose of patient care, it is

crucial to differentiate between infectious encephalitis and post-infectious encephalo-myelitis.[2] Infection with the human herpesvirus 7 (HHV-7) usually happens in childhood and is often asymptomatic. Fever and exanthem subitum are a couple of the clinical signs. Rare cases of HHV-7 invading the central nervous system have been documented.[3-5]

Adenoviruses are widespread infections that cause a wide range of illnesses in children. They are most usually linked to respiratory and gastrointestinal symptoms, but they can also cause ophthalmic, cutaneous, and urinary symptoms. Adenovirus infections can be detected all year round and can happen seldom or in epidemics. There are at least 51 serotypes known to exist, and each serotype may be linked to a distinct range of diseases. Adenovirus infections are rare, but they can cause central nervous system (CNS) dysfunction, which can be linked to a disease that spreads to other parts of the body. There are many other clinical signs of CNS dysfunction, but the two most common ones are encephalitis and meningitis.[6]

Here, we report the case of an 11-year-old biy who had a positive viral real-time polymerase chain reaction (PCR) in his cerebrospinal fluid (CSF) along with a new-onset seizure, fever, and altered level of consciousness. His careful management had a positive result.

CASE REPORT

A male child, aged 11, was admitted to the hospital after suffering from fever, headaches, seizures, and altered level of consciousness (ALOC) for eight days. Eight days prior to admission, he had a fever peaking at 38.7 °C, without accompanying chills, fatigue, or muscle pain. Seizures lasting four minutes occurred alongside the fever, characterized by eye rolling and urinary as well as fecal incontinence. The patient was treated to reduce the fever to 38 °C. He experienced three to four episodes of high fever with headaches but without nausea or vomiting. Although a blood test showed mostly normal results, he was diagnosed with "meningitis" at a nearby hospital. After receiving supportive treatment for two days, including "ceftriaxone sodium" and rehydration, there was no improvement in his condition.

He was transferred to the Pediatric Intensive Care Unit (PICU) due to status epilepticus and a Glasgow Coma Scale (GCS) score of 7/15. Chest X-ray, complete blood count, creatinine, and transaminase levels were normal upon admission. Neurological examination revealed upgoing plantars, brisk reflexes in all four limbs, and increased tone throughout. Upon arrival, he displayed signs of nuchal rigidity and had positive meningeal irritation signs, while a physical check showed no skin rash. A lumbar puncture (LP) and cerebral magnetic resonance imaging (MRI) were performed.

The cerebrospinal fluid (CSF) analysis indicated 120 leucocytes/µl (lymphocytes and neutrophils), 05 red blood cells/µl, protein levels at 72 mg/dl, and glucose levels at 67 mg/dl (with blood glucose at 102 mg/dl). The patient received empirical treatment with corticosteroids, ceftriaxone, vancomycin, and acyclovir. On the second day of hospitalization, his condition deteriorated, resulting in a GCS of 5/10T. The brain MRI revealed mild swelling in the cortex of the inferior frontal lobe and basal ganglia, suggestive of infection. The T2 scan demonstrated hyperintense signals. No growth was detected in the CSF culture and sensitivity tests. The NeuroPCR Combo identified adenovirus and HHV-7. Orbital ultrasound was done, which showed increased optic nerve sheath diameter.

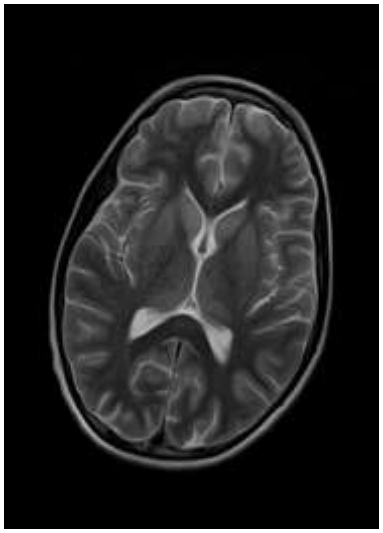

Fig.1 MRI brain T2 scan

Following treatment with ganciclovir, the GCS improved to 15/15, and the patient's overall performance status also enhanced. Consequently, he was discharged; however, he continued to experience low-grade fever. He fully recovered four months later. Based on clinical presentation and risk factors, the microbiological evaluation yielded the following results: gram stain and bacterial culture were negative for alpha-herpesvirus (herpes simplex virus types 1 and 2, and varicella-zoster virus), enterovirus, Epstein-Barr virus, and cytomegalovirus. HHV-7 and adenovirus were identified via the Neuro PCR Combo in the initial CSF sample. However, it was not feasible to perform HHV-7 antibody and avidity testing to differentiate between initial infection and reactivation in the nervous system. Following the microbiological diagnosis, acyclovir was discontinued and ganciclovir was prescribed; the patient responded positively to ganciclovir

DISCUSSION

The symptoms our patient displayed were suggestive of encephalitis. Encephalitis patients typically exhibit changed mental status, ranging from mild impairments to total incapacity to respond. In addition to specific neurologic abnormalities such as hemiparesis, cranial nerve palsies, and increased deep tendon and/or pathologic reflexes, encephalitis frequently causes seizures. Due to the lack of a standardized case definition and diagnostic methods, encephalitis is challenging to diagnose clinically.[2]

Numerous members of the herpes virus family are known to exhibit strong neurotropism and to produce symptoms in both the central and peripheral nervous systems. It is still unclear whether the inflammatory response of the activated immune system or a direct cytotoxic effect is primarily to blame. But like other neurotropic viruses, HHV-7's participation in the central nervous system has just lately been thoroughly studied. The HHV-7 virus is very common. The majority of HHV-7 infections happen in children. It is unclear how HHV-7 contributes to human illness. Infection with HIV-7 is typically asymptomatic.[2]

The double-stranded DNA viruses known as human adenoviruses are classified into seven subgroups and have over 60 serotypes. The most typical prodrome in children is diarrhoa, vomiting, and upper respiratory sickness. A small number of children later experienced coagulopathy, hepatitis, and pneumonia while in the hospital. Just 5% of children get CNS sickness from adenovirus. The most prevalent serotypes linked to adenovirus CNS illness are serotype 7, which is followed by serotypes 3 and 2[1] In this instance, we did not serotype the adenovirus that was found.

An immunocompetent child with HHV-7 and adenovirus meningoencephalitis is described in this paper. For a better understanding of the infection features and clinical manifestations of these viruses, the successful diagnosis and treatment of this case are extremely important. Effective antiviral treatment, prompt virus identification, and precise diagnosis are essential for halting the disease's progression. Simultaneously, a thorough evaluation of the patients' immune condition should be completed in order to identify and address immune variables that could influence how the disease progresses.

Conflict of interest: Nil

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