Periorbital cellulitis with Zoster encephalitis: a case report

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Summary

Herpes Zoster, which commonly affects individuals over 60 years of age, can lead to encephalitis, particularly in elderly or immunocompromised individuals. This case highlights the development of zoster encephalitis following Herpes Zoster ophthalmicus. A 69-year-old woman presented with fever, confusion, orbital pain, and periorbital cellulitis. Her diagnosis was confirmed as Herpes Zoster ophthalmicus, with subsequent development of zoster encephalitis. The patient was treated with acyclovir for three weeks. The patient's symptoms improved significantly after early initiation of antiviral therapy, with a reduction in periorbital edema, eye pain, and vesicular lesions. Upon discharge, the patient showed full recovery of consciousness and minimal periorbital crust lesions. Early antiviral treatment is critical for preventing complications and reducing mortality in patients with Herpes Zoster encephalitis. The zoster vaccine is recommended for individuals aged 50 and older to reduce the incidence and associated complications, such as encephalitis. This case highlights the importance of timely intervention and vaccination in prevention.

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Introduction

Herpes Zoster occurs after the latent phase of Varicella-Zoster Virus (VZV) infection and is more common in the elderly or immunocompromised individuals. Zoster encephalitis, which can follow Herpes Zoster ophthalmicus, can lead to severe neurological sequelae and mortality. Patients with encephalitis often present with symptoms, such as fever, headache, altered consciousness, and seizures. The literature emphasizes that early diagnosis and treatment, particularly antiviral therapy, can mitigate complications. This report presents a case of zoster encephalitis diagnosed after Herpes Zoster ophthalmicus, whose clinical findings improved with early treatment. Informed consent was obtained from the patient for this article.

Case Report

A 69-year-old woman presented to the emergency department with fever, chills, confusion, headache, and pain in her left eye. Three days previously, she visited the ophthalmology clinic because of pain and raised lesions around her left eye and forehead, where she was prescribed ganciclovir, loteprednol, and netilmicin eye drops. The next day, she developed swelling, discharge around the eye, and vesicular lesions, which prompted her to revisit ophthalmology, where she was prescribed valganciclovir; however, she was only able to take it once. Owing to worsening confusion, she was brought to the emergency department.

Her medical history included diabetes mellitus and essential hypertension.

Upon examination, her vital signs were stable. She responded logically to the questions but failed to recognize some relatives. No neck stiffness was observed. Periorbital edema was evident, particularly in the left eye, along with vesicular lesions extending from the left frontal region to the scalp, and discharge from the left eye. No motor deficits were observed.

Initial laboratory findings revealed a leukocyte count of

7,400/mm³, C-reactive protein of 29 mg/L, procalcitonin of 0.4 µg/L, and blood glucose of 660 mg/dL. A Lumbar Puncture (LP) was performed because of a preliminary diagnosis of encephalitis. Unstained microscopic examination of the Cerebrospinal Fluid (CSF) revealed a lymphocyte-predominant cellular increase of 40 leukocytes/mm³, the presence of 500 erythrocytes /mm³), and no observed bacteria. CSF analysis revealed protein levels of 592 mg/dL, and glucose levels of 156 mg/dL. Simultaneous blood glucose level was 600 mg/dL. CSF was cultured on blood agar and MacConkey agar. The CSF culture was negative. For the CSF analysis, multiplex real-time Polymerase Chain Reactions (PCRs) to detect the most common microorganisms associated with Meningitis/Encephalitis panel (ME) in a CSF sample have been developed for a rapid diagnosis. For this purpose, we used the FilmArray® (BioFire Diagnostics, Salt Lake City, USA) multiplex real-time PCR ME panel, which detects the 14 most common bacterial, viral, and fungal pathogens causing infectious meningitis and encephalitis in less than two hours. These include *Escherichia coli* K1*, Haemophilus influenzae, Listeria monocytogenes, Neisseria meningitidis, Streptococcus agalactiae, Streptococcus pneumoniae*, Enterovirus, *Herpes simplex* virus 1 (HSV-1), *Herpes simplex* virus 2 (HSV-2), Human herpesvirus 6 (HHV-6), Human parechovirus, Varicella-Zoster Virus (VZV), Cytomegalovirus (CMV), and *Cryptococcus neoformans/gattii.*

Results

The multiplex real-time PCR assay detected VZV DNA in this CSF sample. Intravenous acyclovir (750 mg 3x daily) was initiated on the same day. Ophthalmology consultation revealed periorbital cellulitis, left eye zoster keratitis, and uveitis, for which topical and oral treatments were recommended.

During follow-up, the patient's consciousness first improved, followed by reduced periorbital edema, headache, and eye pain. The vesicular lesions gradually regressed and crusted. After 21 days of acyclovir treatment, the patient was discharged with neurological and ophthalmological recommendations. At discharge, she displayed minimal periorbital crusted lesions and her consciousness fully recovered (Figures 1-3).

Figure 2. Swelling and vesicular lesions on the face on day 6.

Figure 1. Vesicular eruptions on the face and periorbital area of the patient on day 1.

Figure 3. Crusted lesions on the face and periorbital area on day 15.

Discussion

Encephalitis is a neurological condition accompanied by an inflammatory process in the brain. It is categorized into infectious and noninfectious (post-immunization) types, with viruses being the most common cause. Despite extensive testing, the cause often remains unidentified [9]. Among the viral agents, *Herpes simplex* Virus (HSV) and VZV are the leading causes of infectious encephalitis worldwide and are associated with significant mortality and morbidity. A 2023 review noted that HSV encephalitis has higher mortality and long-term sequelae than VZV encephalitis, with fewer than half of the patients achieving full remission [1].

The diagnostic tools include serological tests, histopathological examinations, and imaging methods. However, nucleic acid amplification testing of the CSF is critical for diagnosing Central Nervous System (CNS) infections, especially viral causes. Empiric acyclovir therapy should be initiated in all suspected encephalitis cases while awaiting the diagnostic results [9].

VZV encephalitis is a severe CNS infection that occurs more frequently in immunosuppressed individuals than in immunocompetent ones. Symptoms included fever, seizures, altered consciousness, and nausea/vomiting. Neurological sequelae are observed in more than 15% of survivors, and mortality rates range between 5-20% [10]. Vesicular skin lesions may not always appear, with reports indicating their absence in 30% of Human Immunodeficiency Virus (HIV)-positive individuals [9].

Cases of zoster encephalitis with clinical presentations similar to those of our patient have been reported, with favorable outcomes following treatment [4,7]. Li *et al*. described a case of Bickerstaff brainstem encephalitis associated with a VZV infection [8]. Unlike their findings, imaging in our case showed no brainstem or other CNS involvement and only soft tissue swelling around the left orbit and frontal area.

Herpes Zoster encephalitis following ophthalmicus is a rare, but serious complication. Vesicular lesions may not always be present, making the diagnosis challenging, particularly in immunocompetent individuals. Early antiviral therapy is crucial for preventing complications and reducing neurological sequelae. Additionally, vaccination against Herpes Zoster has been shown to reduce disease incidence and complications in individuals aged 50 and older [3].

Our case, along with others in the literature, highlights the importance of including Herpes Zoster encephalitis in the differential diagnosis, and underscores the value of a multidisciplinary approach. Reports have documented cases of zoster encephalitis in both immunocompetent and immunosuppressed patients presenting without fever or rash [2,6]. Halling *et al*. reported a case of focal Herpes Zoster encephalitis mimicking low-grade glioma in a 22-year-old immunocompetent patient [6]. In our case, typical zosteriform lesions were observed; however, no pathological findings were observed on brain imaging.

According to the literature, reactivation of Herpes Zoster in an immunocompromised patient can cause other neurological complications besides encephalitis, such as transverse myelitis and polyradiculitis [5]. Close follow-up of immunosuppressed individuals is crucial for prompt detection of potential neurological complications.

Herpes Zoster encephalitis is a preventable and treatable condition that can lead to high morbidity and mortality rates without timely intervention. Early and accurate diagnosis is crucial, and detection of VZV DNA in CSF using polymerase chain reaction plays a key role in this procedure. Additional research on zoster encephalitis will contribute valuable knowledge for the development of prevention, management and early diagnosis strategies.

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