

Varicella Zoster meningitis presenting in an Immunocompetent adolescent

S. Best, G. Mustafa, E. Daly

Department of Paediatrics, Children's Health Ireland at Crumlin, Dublin 12, Ireland.

Abstract

Presentation

Varicella zoster virus (VZV) establishes dormancy following primary infection and reactivates typically in the elderly and immunocompromised hosts. Neurological complications can occur but are rare in immunocompetent hosts. They are also rarely seen without the typical rash and high fever. We describe a case of varicella zoster meningitis in a healthy 13-year-old girl who presented with headache but without fever or a rash. 8 day history of severe headache, poor appetite, lethargy and photosensitivity. This headache was poorly responsive to NSAIDs and triptan. Fundal examination revealed swollen discs, which prompted the need for a lumbar puncture, following a normal CT Brain.

Diagnosis

Varicella zoster virus confirmed on CSF viral panel and FilmArray. CSF revealed a pleocytosis. Blood results unremarkable.

Fundal examination revealed swollen discs.

CT Brain normal. MRI Brain normal.

Confirmed: Varicella Zoster Meningitis

Treatment

Acyclovir (10mg/kg every 8 hours) for 21 days.

Analgesia.

IV fluids.

Discussion

This case report describes an unusual presentation of varicella zoster virus (VZV) positive aseptic meningitis in an immunocompetent adolescent who presented with a headache but no rash or fever. This highlights the need to recognise that VZV may be a potential cause of aseptic meningitis in a healthy child despite atypical presentations.

Introduction

Varicella zoster virus (VZV), a member of the herpes virus family, commonly causes viral infections through aerosolised transmission or direct contact.¹ Primary varicella infection results in a diffuse vesicular rash and fever. Secondary infection occurs through endogenous reactivation of the latent VZV, and typically occurs in adults or immunocompromised hosts as a localized skin infection, zoster.¹

Case Report

A 13-year-old girl presented with an 8-day history of severe headache. She had previously presented 4 days prior, where she was thought to be having a migraine, and discharged with Sumatriptan. This headache was associated with vomiting, lethargy and photosensitivity. There was no associated fever, rash, visual disturbances or neck stiffness. She had no known sick contacts.

Her past medical history includes migraine. Her vaccinations were up to date. She had varicella at 9 months which followed an uncomplicated course. She has a family history of migraine.

On examination she appeared unwell with mild dehydration. She was afebrile. She was alert and orientated and her examination was entirely normal with no neurological deficit.

Blood results were unremarkable, with a white cell count of $7.4 \times 10^9/L$, a neutrophil count of $5.22 \times 10^9/L$, C-Reactive Protein (CRP) of $<4\text{mg/L}$. Immunological work-up was unremarkable. A CT Brain did not identify any intracranial pathologies, and an MRI Brain ruled out encephalitis.

She was started on analgesia, with only slight symptomatic improvement. Fundal examination revealed mild disc swelling. This is shown in image 1.



Image 1: Retina depicting swollen discs.

Thereafter a lumbar puncture was performed. The results are shown in Table 1, which confirmed Varicella Zoster virus by Film array and viral PCR analysis.

Table 1: CSF Results

Parameter	Result	Normal Range
Opening Pressure	24.5 cm H ₂ O	15 to 25 cm H ₂ O
WBC	118 x 10 ⁹ /L	0 to 5 x 10 ⁹ /L
RBC	1565 x 10 ⁹ /L	0 x 10 ⁹ /L
Glucose	3.3 mmol/L	3.3 to 4.5 mmol/L
Protein	0.34 gr/L	0.2 to 0.6 gr/L
Gram Stain	Negative	Negative
Culture	Negative	Negative

The patient was initiated on intravenous Acyclovir which led to symptomatic improvement within two days. Repeat fundal examination showed resolution of the ocular pressure and retinal swelling. On day 12, however, there was return of mild headache and vomiting. The decision was therefore made to complete 21 days of treatment. Repeat CSF analysis was unremarkable with no VZV detected. A repeat CT Brain was normal.

Discussion

Varicella zoster virus (VZV) belongs to the herpes virus family. Primary infection is characterized by vesicular lesions on an erythematous base ¹. Following infection, the VZV establishes latency in the dorsal root ganglia of the sensory nerves. It can present as herpes

zoster with the possibility of complications such as neuralgia, meningoencephalitis, cerebellitis, amongst others.²

Reactivation of VZV typically occurs with waning of cell-mediated immunity in the elderly and immunosuppressed patients³. Complications, particularly meningitis, is relatively uncommon in immunocompetent children.⁴

The age of onset of herpes zoster follows two peaks, 4-5 years and 10-13 years of age⁶. There is currently a paucity of data which describe the specific risk factors that may lead to development of herpes zoster, particularly meningitis, in the paediatric population. As occurred with our patient, it has been identified that primary varicella in the first year of life may be a risk factor for developing secondary reactivation⁶. This may be due to the immaturity of the immune system leading to a low specific cellular and humoral immune response⁵. Terada K et al showed that VZV-specific antibodies were significantly lower in children who contracted chickenpox at less than one year of age⁷

It is thought that puberty may be a trigger for herpes zoster reactivation. Oestrogen is known to be an inhibitor of cell-mediated immunity. However, this is not widely described but may lead to the importance of looking at hormones as factors that may affect immune deficiencies in immunocompetent children⁴.

Our case is therefore unique in that our patient, who is an immunocompetent host, presented with aseptic meningitis caused by VZV reactivation without skin lesions. In conclusion, it is important to recognize that VZV may be a potential cause of aseptic viral meningitis in immunocompetent children, with or without a rash.

Declarations of Conflicts of Interest:

None declared.

Corresponding author:

Sarah Best,
Department of Paediatrics,
Children's Health Ireland at Crumlin Hospital, Cooley Road,
Crumlin,
Dublin 12,
Ireland.

E-Mail: sarah.best@childrenshealthireland.ie.

References:

1. Patil, A., Goldust, M. and Wollina, U. (2022) 'Herpes zoster: A review of Clinical Manifestations and management', *Viruses*, 14(2), p. 192. doi:10.3390/v14020192.
2. Khaliq, M.F., Kochar, T. and John, M. (2018) 'Varicella zoster meningitis: An atypical case of zoster reactivation in immunocompetent young adult', *BMJ Case Reports* [Preprint]. doi:10.1136/bcr-2017-223257.
3. Gershon, A.A. *et al.* (2010) 'Advances in the understanding of the pathogenesis and epidemiology of herpes zoster', *Journal of Clinical Virology*, 48. doi:10.1016/s1386-6532(10)70002-0.
4. Yasuda, R. *et al.* (2019) 'Herpes zoster and meningitis in an immunocompetent child: A case report', *Journal of Medical Case Reports*, 13(1). doi:10.1186/s13256-019-2082-z.
5. Oliveira, K. *et al.* (2018) 'Varicella-zoster virus meningitis in an immunocompetent paediatric patient', *Neurología (English Edition)*, 33(9), pp. 623–624. doi:10.1016/j.nrleng.2016.06.011.
6. Takayama, N., Yamada, H. and Kaku, H. (2000) 'Herpes zoster in immunocompetent and immunocompromised Japanese children', *Pediatrics International*, 42(3), pp. 275–279. doi:10.1046/j.1442-200x.2000.01227.x.
7. Terada, K. *et al.* (1994) 'Varicella-zoster virus (VZV) reactivation is related to the low response of VZV-specific immunity after chickenpox in infancy', *Journal of Infectious Diseases*, 169(3), pp. 650–652. doi:10.1093/infdis/169.3.650.