


# A Rare Case of an Immunocompetent Male With Zoster Meningitis

Journal of Investigative Medicine High  
Impact Case Reports  
Volume 8: 1–3  
© 2020 American Federation for  
Medical Research  
DOI: 10.1177/2324709620952212  
journals.sagepub.com/home/hic  


Mohammed Ali Faluk, MD<sup>1,2</sup>, Shraddhadevi Makadia, MD<sup>1,2</sup>,  
Ramy Abdelmaseih, MD<sup>1,2</sup>, S. Mustajab Hasan, MD<sup>1,2</sup>,  
and Khalid Abusaada, MD<sup>1,2</sup>

## Abstract

Varicella zoster meningitis is an uncommon complication of herpes zoster, especially in immunocompetent patients. We report a case of a healthy 45-year-old male who developed aseptic meningitis as a result of reactivated varicella zoster virus infection. This case highlights the importance of remaining cognizant of varicella zoster virus as a cause of meningitis in not only the elderly or immunocompromised patients but also in patients who are healthy.

## Keywords

viral meningitis, aseptic meningitis, CNS infections, zoster meningitis

## Introduction

Varicella zoster virus (VZV) is a rare cause of viral meningitis in immunocompetent patients. In this case, we present an immunocompetent middle-aged man who presented with signs and symptoms of meningitis associated with dermatomal skin rash.

## Case Presentation

A 45-year-old male with a past medical history of hyperlipidemia presented with complaint of headache and fever. Forty-eight hours prior to admission, he became febrile with a temperature of 101 °F, lethargic, and developed headache and noticed rash on the left side of his back. Subsequently, the patient had myalgia, neck stiffness, nausea, and vomiting. He was taken to urgent care clinic where he was found to be confused and not able to answer questions appropriately. He was sent to the emergency room immediately thereafter. On arrival, the patient was alert, awake, and oriented to self, place, and time but drowsy. On physical examination, the patient had vesicular rash on the T10 dermatome (Figure 1) as well as mild neck rigidity. The patient was afebrile in the emergency room and had normal white blood cells count of 7.4. Influenza A/B antigens were negative. Computed tomography scan of brain without contrast and magnetic resonance imaging with contrast showed no acute findings. He was started on empiric antibacterial coverage with vancomycin and ceftriaxone as well as acyclovir after lumbar puncture was performed. Cerebrospinal fluid (CSF) analysis showed lymphocytic pleocytosis with 741 white blood cells, 97% lymphocytes, 3% neutrophils, glucose 41, and protein 296.

CSF-polymerase chain reaction (PCR) was negative for herpes simplex virus 1 and 2 but VZV DNA was detected by the PCR in CSF. HIV-1/2 AG/AB was nonreactive and HIV-1/2 RNA was not detected as well. Antibiotics were stopped and acyclovir was continued. The patient improved clinically and was discharged home on a 14-day course of intravenous acyclovir with close follow-up at the outpatient infectious disease clinic (Figure 1).

## Discussion

VZV, a member of the Herpesviridae family, is a highly contagious neurotropic virus that infects nearly all humans.<sup>1</sup> Primary infection causes the characteristic skin rash with itchy blisters and pustules, while secondary reactivation infection causes a painful dermatomal rash that can be complicated by central or peripheral nervous system involvement and typically affects elderly and immunocompromised populations.

Following VZV reactivation and replication, the involved sensory ganglion exhibits intense inflammation and hemorrhagic necrosis.<sup>2</sup> Zoster is a necrotizing inflammation of the spinal ganglion of the involved nerve that is

<sup>1</sup>University of Central Florida, Orlando, FL, USA

<sup>2</sup>Ocala Regional Medical Center, Ocala, FL, USA

Received May 10, 2020. Revised July 22, 2020. Accepted July 25, 2020.

## Corresponding Author:

Mohammed Ali Faluk, MD, 1601 SW 27th Avenue, APT 801, Ocala, FL 34471, USA.

Email: kamas318@gmail.com





**Figure 1.** Vesicular skin eruption involving the area of the T10 dermatome on the left.

in direct contact with CSF and rarely causes herpes zoster meningitis or encephalitis.

Per the Centers of Disease Control and Prevention, the lifetime risk of developing zoster is 33%, increasing to 50% in patients of 80 years of age due to cancers, especially leukemia and lymphoma, HIV infection, bone marrow or solid organ transplantation, and immunosuppressive medications.<sup>3</sup> The overall annual incidence of zoster is about 0.46% and up to 1% in patients above the age of 80.<sup>4</sup> Besides the aforementioned risk factors, the followings are associated with increased risk of herpes zoster development: being White, female, or physical trauma exposure.<sup>5,6</sup> The most common complication of VZV is post-herpetic neuralgia, followed by zoster ophthalmicus or oticus. The development of central neurological complications of VZV reactivation including aseptic meningitis, encephalitis, or myelitis is relatively uncommon, especially in immunocompetent patients. A large tertiary hospital-based series studied the epidemiological characteristics of central nervous system (CNS) infection by VZV in patients older than 65 years of age and reported mean annual incidence of VZV CNS infection of 0.003%.<sup>7</sup> On literature review, only a handful of cases have been reported of VZV reactivation in immunocompetent patients, most of which involved adult or elderly patients.<sup>8-12</sup>

For proper diagnosis, CSF analysis using molecular biology tests such as PCR—to detect viral particles is considered a cornerstone.<sup>13</sup> However, a negative result does not rule out the infection, especially if the CSF sample was obtained after the initiation of antiviral therapy, hence the importance of CSF analysis prior to treatment. Although a vesicular rash with dermatomal distribution is a typical symptom of VZV, some cases of VZV meningitis without skin lesions have been described.<sup>14</sup> VZV aseptic meningitis CSF findings typically includes the following: lymphomonocytic pleocytosis of <500 cells/ $\mu$ L, moderately elevated total proteins, and normal lactate levels.<sup>15</sup> It is important to ascertain that reactive pleocytosis and some degree of meningeal irritation

frequently associates with otherwise uncomplicated herpes zoster, which can occur in 40% of cases.<sup>16</sup> Other diagnostic clues include an increased production of anti-VZV antibodies in the CSF suggesting active disease (serum/CSF VZV antibody ratio  $\leq 20$ ) or (CSF antibody/serum antibody)/(CSF albumin/serum albumin)  $\geq 2$ .

Guideline recommended therapy for VZV meningitis is intravenous acyclovir 10 to 15 mg/kg every 8 hours for 10 to 14 days. Oral valacyclovir 2 g every 6 hours for at least 10 to 14 days can be considered in patients with no other risk factors.<sup>17</sup> Valacyclovir is metabolized into acyclovir in the intestine and liver and has the same antiviral activity as acyclovir.<sup>18</sup> When choosing between valacyclovir and acyclovir, we have to keep in account the 50% inhibitory concentration, drug concentration in the CSF, and their potential adverse effects. As intravenous acyclovir is associated with more side effects compared with oral valacyclovir, including CNS toxicity, rarely permanent CNS, and renal damage as well as it is associated with an increased cost of health care, it is considered as a treatment option.<sup>19</sup> That being said, more research needs to be done as there are not many reported cases of patients successfully treated with oral valacyclovir. One percent to 6% of individuals will experience the second episode of zoster. However the recurrence of zoster meningitis is unknown.<sup>20</sup> The overall prognosis of VZV meningitis is good, especially in healthy individuals and rarely causes any sequelae.<sup>21</sup>

## Follow-up and Outcome

The patient successfully completed 2 weeks of treatment without any side effects at the outpatient infectious disease clinic. The patient symptoms completely resolved.

## Conclusion

VZV meningitis is an infrequent cause of aseptic meningitis. However, with increasing cases of VZV infection, it is crucially important to suspect VZV infection as a potential cause in an immunocompetent patient with or without the typical vesicular dermatomal rash. Early antiviral therapy initiation is warranted to prevent further neurologic sequelae and ensures good prognosis.

## Acknowledgments

The authors gratefully acknowledge and thank our patient for the kind support.

## Author Contributions

Mohammed Ali Faluk, Shraddhadevi Makadia, and Ramy Abdelmaseih wrote the original draft of the paper. Mohammed Ali Faluk participated in gathering the data for the case and also compiling the draft. All authors read and approved the final manuscript.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) disclosed the following financial support for the research, authorship, and/or publication of this article: This research was supported (in whole or in part) by the HCA Healthcare and/or HCA Healthcare affiliated entity. The views expressed in this publication represent those of author(s) and do not necessarily the official views of HCA Healthcare or any of its affiliated entities.

### Ethics Approval

Our institution does not require ethical approval for reporting individual cases or case series.

### Informed Consent

Verbal informed consent was obtained from the patient for their anonymized information to be published in this article.

### References

- Marin M, Meissner HC, Seward JF. Varicella prevention in the United States: a review of successes and challenges. *Pediatrics*. 2008;122:e744-e751.
- Watson CP, Deck JH, Morshead C, et al. Post-herpetic neuralgia: further post-mortem studies of cases with and without pain. *Pain*. 1991;44:105-117.
- Yawn BP, Gliden D. The global epidemiology of herpes zoster. *Neurology*. 2013;81:928-930.
- Pinchinat S, Cebrian-Cuenca AM, Bricout H, Johnson RW. Similar herpes zoster incidence across Europe: results from a systematic literature review. *BMC Infect Dis*. 2013;13:170.
- Schmader K, George LK, Burchett BM, Pieper CF, Hamilton JD. Racial differences in the occurrence of herpes zoster. *J Infect Dis*. 1995;171:701-704.
- Thomas SL, Wheeler JG, Hall AJ. Case-control study of the effect of mechanical trauma on the risk of herpes zoster. *BMJ*. 2004;328:439.
- Arruti M, Piñeiro LD, Salicio Y, et al. Incidence of varicella zoster virus infections of the central nervous system in the elderly: a large tertiary hospital-based series (2007-2014). *J Neurovirol*. 2017;23:451-459.
- Mantero V, De Toni Franceschini L, Lillia N, Guccione A, Santilli I, Agostoni E. Varicella-zoster meningoencephaloradiculoneuropathy in an immunocompetent young woman. *J Clin Virol*. 2013;57:361-362. doi:10.1016/j.jcv.2013.04.006
- Goyal H, Thakkar N, Bagheri F, et al. Herpes zoster meningitis with multidermatomal rash in an immunocompetent patient. *Am J Emerg Med*. 2013;31:1622.e1-e2.
- Kangath RV, Lindeman TE, Brust K. Herpes zoster as a cause of viral meningitis in immunocompetent patients. *BMJ Case Rep*. 2013;2013:bcr2012007575.
- Han JY, Hanson DC, Way SS. Herpes zoster and meningitis due to reactivation of varicella vaccine virus in an immunocompetent child. *Pediatr Infect Dis J*. 2011;30:266-268. doi:10.1097/INF.0b013e3181f63cf9
- Mpaka M, Karantanas AH, Zakyntinos E. Atypical presentation of varicella-zoster virus encephalitis in an immunocompetent adult. *Heart Lung*. 2008;37:61-66. doi:10.1016/j.hrtlng.2007.02.009
- Nagel MA, Forghani B, Mahalingam R, et al. The value of detecting anti-VZV IgG antibody in CSF to diagnose VZV vasculopathy. *Neurology*. 2007;68:1069-1073. doi:10.1212/01.wnl.0000258549.13334.16
- Jhaveri R, Sankar R, Yadzani S, Cherry JD. Varicella-zoster virus: an overlooked case of aseptic meningitis. *Pediatr Infect Dis J*. 2003;22:96-97.
- Nowak DA, Boehmer R, Fuchs HH. A retrospective clinical, laboratory and outcome analysis in 43 cases of acute aseptic meningitis. *Eur J Neurol*. 2003;10:271-280.
- Elliott KJ. Other neurological complications of herpes zoster and their management. *Ann Neurol*. 1994;35(suppl):S57-S67.
- Cunha BA, Jeffrey B. The pharmacokinetic basis of oral valacyclovir treatment of herpes simplex virus (HSV) or varicella zoster virus (VZV) meningitis meningoencephalitis or encephalitis in adults. *J Chemother*. 2017;29:122-125.
- Gregory M, Valacyclovir Renee-Claude M. Valacyclovir. In: Grayson ML, Suzanne Crowe, and James McCarthy, et al, eds. *Kucers' The Use of Antibiotics*. 6th ed. ASM Press; 2010:2361-2369.
- Gnoni M, Zaheer K, Vasser MM, et al. Varicella zoster aseptic meningitis: report of an atypical case in an immunocompetent patient treated with oral valacyclovir. *IDCases*. 2018;13:e00446. doi:10.1016/j.idcr.2018.e00446
- Yawn BP, Saddier P, Wollan PC, St Sauver JL, Kurland MJ, Sy LS. A population-based study of the incidence and complication rates of herpes zoster before zoster vaccine introduction. *Mayo Clin Proc*. 2007;82:1341-1349. doi:10.4065/82.11.1341
- Nakajima H, Hara M, Morita A, Kamei S. Neurologic complications of varicella-zoster virus infection. In: Thomasini RL, ed. *Human Herpesvirus Infection*. IntechOpen; 2020. https://doi.org/10.5772/intechopen.83036