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Is There a Direct Pathway Linking Herpes Zoster Ophthalmicus to Extra-Axial Hemorrhage?

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ABSTRACT

Introduction: Herpes zoster ophthalmicus (HZO) results from reactivation of latent varicella-zoster virus (VZV) and may involve ocular, neural, and vascular structures. Although VZV vasculopathy is commonly associated with ischemic stroke, hemorrhagic and extra-axial manifestations remain rare**. Case Presentation:** We report a 57-year-old man who presented with acute speech impairment and right-sided weakness. Neurological examination demonstrated Broca's aphasia, right upper motor neuron facial palsy, and right hemiparesis. Two weeks before admission, he had been diagnosed with left-sided HZO, which resolved following antiviral therapy. Brain computed tomography revealed a hypodense extra-axial lesion in the left frontotemporal region, suggestive of late subdural hemorrhage, with subdural hygroma considered as a differential diagnosis. The temporal relationship between HZO and the neurological event raised suspicion of VZV-associated vasculopathy with atypical hemorrhagic involvement**. Conclusion:** This case highlights an uncommon neurological complication of HZO presenting with cortical deficits and extra-axial hemorrhagic pathology rather than the more typical ischemic stroke. Clinicians should maintain a high index of suspicion for both ischemic and hemorrhagic VZV-related vascular complications in patients presenting with new focal neurological deficits after HZO, as early recognition and appropriate neuroimaging are essential for accurate diagnosis and timely management.

Keywords: Extra Axial Hemorrhage, Herpes Zoster Ophthalmicus, Varicella Zoster Virus, Vasculopath

INTRODUCTION

Herpes zoster ophthalmicus (HZO) caused by the reactivation of latent Varicella-zoster virus (VZV) within the ophthalmic division of the trigeminal nerve. Reactivation can extend beyond cutaneous involvement, potentially affecting ocular structures, cranial nerves, and cerebral blood vessels. Recent reviews describe a wide range of neurological complications associated with VZV reactivation, including vasculopathy (Langan *et al*., 2023; Tofade *et al*., 2023). Epidemiological data confirm that the risk of stroke increases after zoster infection, especially within the first weeks following rash onset. Meta-analysis on 2023 reported a relative risk of 1.80 (95% CI 1.42–2.29) for stroke within 14 days after zoster, and elevated risk persisted up to a year (Tang *et al*., 2023; Sundström *et al*., 2023).

Most documented vascular complications after VZV reactivation involve ischemic infarction. However, there is growing recognition that hemorrhagic events may occur. A recent case described small intracerebral hemorrhages in a patient with VZV vasculopathy confirmed by MRI and CSF finding (Hofstrand *et al*., 2023). Furthermore, reports note that VZV infection can cause retinal vasculopathy without overt retinitis, indicating that the virus may selectively affect vascular beds (Mowatt *et al*., 2022). The evidence supports the idea that VZV can damage vessel walls and compromise vascular integrity, potentially leading to bleeding or vascular leakage (Langan *et al*., 2023; Donohoe *et al*., 2021).

This case is interesting because our patient developed a sudden onset of broca's aphasia and right-sided weakness two weeks after resolved HZO, without traditional vascular risk factors. The temporal relation suggests a link to recent VZV reactivation. In addition, neuroimaging revealed a left frontotemporal hypodense extra - axial lesion, raising concern for late subdural hemorrhage or subdural hygroma rather than a typical ischemic infarct. Presentation of extra-axial fluid collection or hemorrhage following HZO is rarely reported,

even though current literature highlights the broad neurological consequences of VZV (Langan *et al*., 2023; Hofstrand *et al*., 2023; Mowatt *et al*., 2022).

Another reason this report matters is therapeutic and diagnostic implications. Studies show that recombinant zoster vaccination (RZV) reduces the incidence of HZO and lowers risk of stroke in vaccinated individuals (Sundström *et al*., 2023). If VZV can indeed cause hemorrhagic or extra-axial vascular pathology beyond ischemia, clinicians need awareness of these possible outcomes especially in patients with recent HZO who develop focal neurological deficits. Early recognition and appropriate imaging could lead to better patient management.

The purpose of this report is to document a rare case of post-HZO neurological complication presenting as an extra-axial hypodense lesion, to discuss diagnostic challenges differential diagnoses, and to emphasize that VZV reactivation may result in more than ischemic events.

CASE PRESENTATION

A 57 years old man was referred from a primary health care center to the Emergency Department of dr. H. Koesnadi Regional Hospital, Bondowoso, due to a sudden onset of speech disturbance. The patient was unable to speak or respond appropriately to questions but was able to comprehend verbal commands. The symptoms had begun at approximately 6:00 a.m. (8 hours prior to presentation) and were preceded by difficulty articulating words. Three days before admission, the patient reported experiencing headache and tingling sensations in the right upper and lower extremities, which he initially ignored. These symptoms progressively worsened, leading to weakness of the right side of the body.

Two weeks prior, the patient had been diagnosed with ophthalmic herpes zoster, presenting with multiple vesicular eruptions on the left side of the face within the distribution of the first branch of the trigeminal nerve. The lesions were associated with a burning sensation but without visual impairment. He was prescribed a 5-day course of antiviral therapy. The vesicles resolved and result post-inflammatory hyperpigmentation (PIH), as shown in **Figure 1**. He denied nausea, vomiting, fever, significant recent weight loss, or history of head trauma. There was no history of diabetes mellitus or hypertension.

Figure 1. Left-sided herpes zoster ophthalmicus.

On admission, the patient's vital signs were within normal limits: blood pressure 133/78 mmHg, respiratory rate 19 breaths per minute, heart rate 97 beats per minute, temperature 36.3°C, and oxygen saturation 98% on room air. Neurological examination revealed right-sided weakness with a Medical Research Council (MRC) muscle strength grade of 3/5, while the left extremities were normal (5/5). A mild right upper motor neuron-type facial palsy and broca's aphasia were observed. A non-contrast head computed tomography (CT) scan demonstrated a hypodense area in the left frontotemporal region, suggestive of a late subdural hemorrhage with a subdural hygroma considered as a differential diagnosis (**Figure 2**). A chest radiograph was obtained as part of the initial evaluation and demonstrated no significant abnormalities, with clear lung fields and no evidence of acute cardiopulmonary pathology **(Figure 3).**

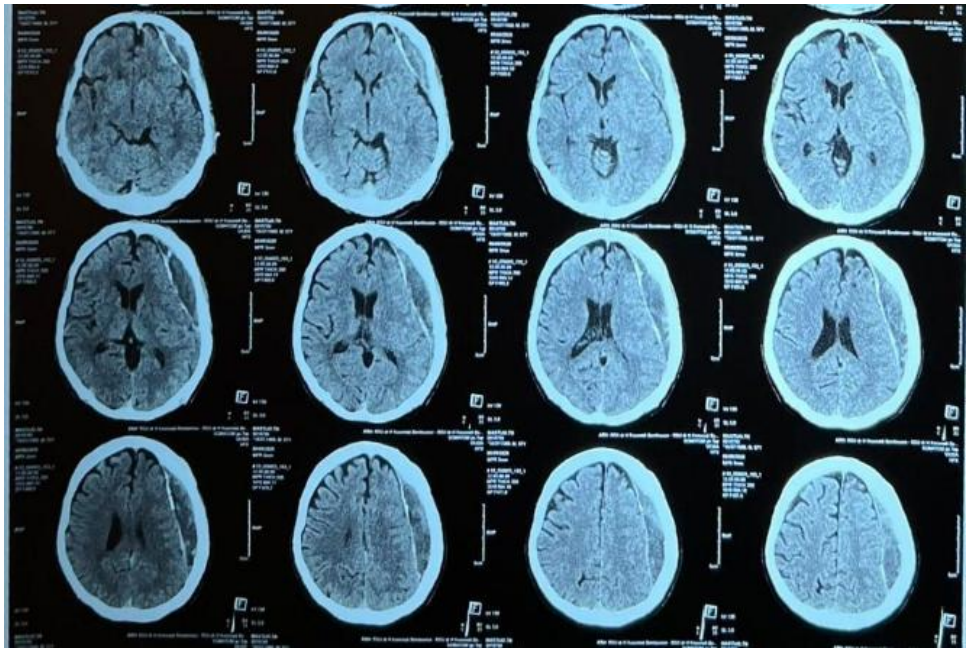

Figure 2. Non-contrast head CT demonstrating a left frontotemporal hypodense lesion, suggestive of late subdural hemorrhage

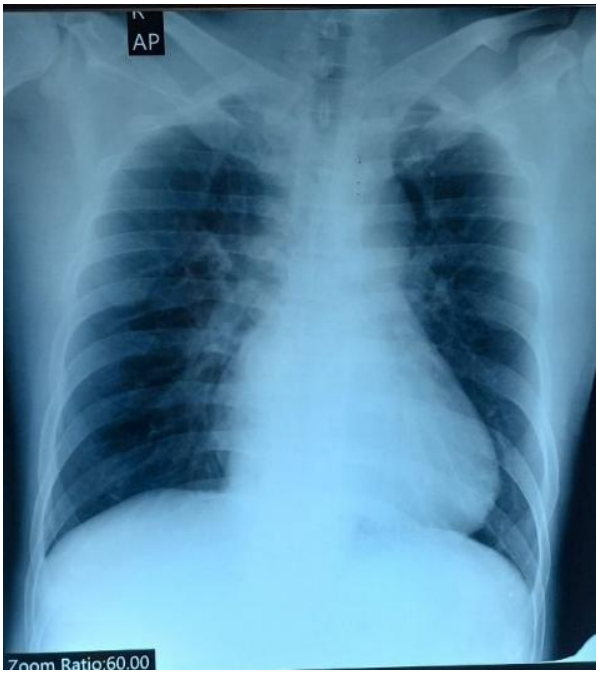

Figure 3. Chest radiograph showing unremarkable findings.

DISCUSSION

We report a case of acute broca's aphasia and right-sided hemiparesis with neuroimaging showing a left frontal hypodense collection consistent with late subdural hemorrhage or subdural hygroma, occurring two weeks after ophthalmic herpes zoster (HZO). The novelty of this case is twofold: (1) the temporally proximate occurrence of HZO and a focal cortical/subdural complication, and (2) presentation as cortical signs dominated by expressive aphasia rather than a pure ischemic stroke. While HZO is an established risk factor for cerebrovascular events primarily ischemic stroke the appearance of a subdural collection (hygroma/late SDH) as a potential manifestation of VZV-related vasculopathy is uncommon.

Ischemic stroke is the most frequently reported neurological complication of HZO, fewer than ten cases in the literature have described subdural fluid collections or hemorrhage-like presentations after VZV reactivation. The virus induced vasculopathy and stroke syndrome after herpes zoster attacks have been reported since the early 1970s (Kang *et al*., 2009). It recognized the virus able to replicate in cerebral arteries. It is hypothesized to spread along the nerve fibers to the blood vessels where it induces further inflammatory and thrombotic responses (Nagel *et al*., 2018).

Two major spectrums of VZV vasculopathy have been identified: large- and small-vessel VZV vasculopathy. In large-vessel VZV vasculopathy, the involved vessels are damaged by virus-induced inflammation, presented as granulomatous angiitis in pathology, and can result in stroke. Small-vessel VZV vasculopathy has many nonspecific manifestations such as fever, headache, seizures, weakness, consciousness disturbances, and cognitive impairments, known as small-vessel encephalitis (Nagel *et al*., 2018). Clinical warning signs and symptoms suggestive of zoster vasculopathy include: Headaches, Fever, Mental

status changes, Aphasia, Ataxia, Hemianopia, Hemisensory loss, Monocular visual loss, and Acute hemiplegia (Bandeira *et al*., 2016).

VZV is believed to disseminate directly through the intracranial branches of the trigeminal nerve to the ipsilateral arterial walls in patients with herpes zoster ophthalmicus (HZO). This process may result in delayed neurological manifestations, such as contralateral hemiparesis. The latency period between the onset of HZO and the development of neurological symptoms typically ranges from several days to up to six months (Shah *et al*., 2015). Vasculopathy that happened after the reactivation on VZV can caused accumulation fluid or hemorrhage on subdural space. The viruses travel transaxonally to cerebral arteries where nerves terminate in the adventitia (Shah *et al*., 2015). The virus infects cells in the vessel wall (adventitia, media) leading to an inflammatory vasculopathy (Gilden *et al*., 2002). Infected vessel walls recruit immune cells: neutrophils early, then T cells and macrophages. These inflammatory cells produce matrix metalloproteinases (MMPs), which can degrade the extracellular matrix of the vessel wall. these enzymes can lead to extracellular matrix breakdown, weakening of the vessel wall, and aneurysm formation even rupture (Shah *et al*., 2015). The combination of endothelial damage, disrupted vessel wall architecture, and perivascular inflammation increases vessel permeability. While classic descriptions emphasize intracerebral or subarachnoid hemorrhage, the same permeability / rupture mechanisms can allow plasma / blood components to extravasate into subdural or subarachnoid spaces, producing hygroma (proteinaceous fluid) or frank subdural hematoma in rare cases. Case reports and radiologic series document hemorrhagic meningoencephalitis and intracranial hemorrhages associated with VZV, supporting this pathway (Grahn *et al*., 2015).

Establishing a diagnosis of varicella-zoster virus–associated vasculopathy remains difficult, as classical cutaneous signs are frequently lacking, and the condition is an infrequent and underdiagnosed complication of VZV infection (Powell *et al*., 2015). However, unlike the majority of published cases, the imaging findings in this case were extra-axial and not suggestive of ischemic infarction, making diagnosis more challenging. Because VZV vascular damage can present as ischemia, hemorrhage, or extra-axial collections, clinicians should consider VZV in patients with new focal neurological deficits following HZO. Diagnostic confirmation is aided by CSF anti-VZV IgG or PCR, and early antiviral therapy (acyclovir) ± corticosteroids is recommended when VZV vasculopathy is suspected although vessel wall damage may persist despite therapy. Early recognition of varicella-zoster virus (VZV) vasculopathy is essential, as untreated disease carries a mortality rate of up to 25%, whereas outcomes are generally favorable with timely intravenous acyclovir therapy. Standard treatment consists of intravenous acyclovir at a dose of 10–15 mg/kg administered three times daily for 10–14 days, combined with prednisone at 1 mg/kg given either intravenously or orally depending on disease severity. In the majority of reported cases, adjunctive corticosteroid therapy has been associated with clinical improvement or stabilization of prognosis (Bandeira *et al*., 2016).

The limitations of this report are the absence of MRI evaluation, which could have provided greater diagnostic clarity and cerebrospinal fluid analysis and PCR testing for VZV were not performed, preventing definitive confirmation of VZV vasculopathy. The combination of delayed neurological symptoms, lack of vascular risk factors, and atypical radiographic findings underscores the uniqueness of this case. The temporal association between HZO and subsequent focal deficits further strengthens the likelihood of VZV-associated pathology. This case highlights the need for clinicians to consider VZV vasculopathy in patients with new neurological deficits following HZO, even after apparent resolution of skin lesions. Early neuroimaging and neurological evaluation may facilitate timely diagnosis and prevent further complications.

CONCLUSION

Extra-axial neurological involvement is an uncommon but potentially serious complication of herpes zoster ophthalmicus (HZO). This case suggests that varicella-zoster virus (VZV) reactivation may result in atypical vascular manifestations beyond ischemic stroke, presenting with cortical deficits and extra-axial pathology such as subdural hygroma or late subdural hemorrhage. The temporal association with HZO, absence of traditional vascular risk factors, and atypical imaging findings support a possible role of VZV-associated vasculopathy. Clinicians should consider VZV-related vascular complications in patients with new focal neurological deficits following HZO, even after resolution of skin lesions.

REFERENCE

Bandeira, F., Roizenblatt, M., Levi, G. C., de Freitas, D., & Belfort, R., Jr. (2016). Herpes zoster ophthalmicus and varicella zoster virus vasculopathy. *Arquivos Brasileiros de Oftalmologia, 79*(2), 126–129. https://doi.org/10.5935/0004-2749.20160036

Donohoe, C., Gui, Z., & Kiani Nia, N. (2021). Varicella-zoster virus vasculitis: A case report of enteric reactivation with vasculopathy leading to arterial dissection, stroke, and subarachnoid hemorrhage. *Archives of Clinical and Medical Case Reports, 5*(6), 792–800.

Gilden, D. H., Mahalingam, R., Cohrs, R. J., Kleinschmidt-DeMasters, B. K., & Forghani, B. (2002). The protean manifestations of varicella-zoster virus vasculopathy. *Journal of NeuroVirology, 8*(Suppl. 2), 75–79. https://doi.org/10.1080/13550280290167902

Grahn, A., & Studahl, M. (2015). Varicella-zoster virus infections of the central nervous system. *Journal of Infection, 71*(3), 281–293. https://doi.org/10.1016/j.jinf.2015.06.004

Hofstrand, J., et al. (2023). Hemorrhagic stroke due to varicella-zoster virus vasculopathy. *Journal of NeuroVirology*.

Kang, J. H., Ho, J. D., Chen, Y. H., & Lin, H. C. (2009). Increased risk of stroke after a herpes zoster attack: A population-based follow-up study. *Stroke, 40*(11), 3443–3448. https://doi.org/10.1161/STROKEAHA.109.562017

Kleinschmidt-DeMasters, B. K., & Gilden, D. H. (2001). Varicella-zoster virus infections of the nervous system: Clinical and pathologic correlates. *Archives of Pathology & Laboratory Medicine, 125*(6), 770–780.

Langan, S. M., Smeeth, L., Margolis, D. J., et al. (2023). The spectrum of neurological manifestations of varicella-zoster virus reactivation. *Viruses, 15*(8), 1663.

Mowatt, L., et al. (2022). Retinal vasculopathy following varicella-zoster virus infection. *Journal of Ophthalmic & Vision Research, 17*(1), 10–18.

Nagel, M. A., & Bubak, A. N. (2018). Varicella zoster virus vasculopathy. *The Journal of Infectious Diseases, 218*(Suppl. 2), S107–S112. https://doi.org/10.1093/infdis/jiy425

Powell, D. R., II, Patel, S., & Franco-Paredes, C. (2015). Varicella-zoster virus vasculopathy: The growing association between herpes zoster and strokes. *The American Journal of the Medical Sciences, 350*(3), 243–245. https://doi.org/10.1097/MAJ.0000000000000327

Saxena, A., Khiangte, B., Tiewsoh, I., & Jajoo, U. N. (2013). Herpes zoster encephalitis presenting as multiple cerebral hemorrhages: A rare presentation. *Journal of Medical Case Reports, 7*, 155. https://doi.org/10.1186/1752-1947-7-155

Shah, J., Poonawala, H., Keay, S. K., Serulle, Y., Steven, A., Gandhi, D., & Cole, J. W. (2015). Varicella-zoster virus vasculopathy: A case report demonstrating vasculitis using black-blood MRI. *Journal of Neurology & Neurophysiology, 6*, 342. https://doi.org/10.4172/2155-9562.1000342

Sundström, K. B., Yin, L., Sällberg, M., et al. (2023). Increased stroke risk following herpes zoster infection and protection with zoster vaccine. *Clinical Infectious Diseases, 76*(3), e1335–e1342.

Tang, J. L. Y., Yeo, A., Lim, W. Y., et al. (2023). Stroke risk after varicella-zoster virus infection: A systematic review and meta-analysis. *Journal of NeuroVirology, 29*(5), 722–734.

Tofade, T. O., & Chwalisz, B. K. (2023). Neuro-ophthalmic complications of varicella-zoster virus. *Current Opinion in Ophthalmology, 34*(6), 470–475.