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Case report

Molecular diagnosis and ocular imaging of varicella zoster virus associated neuroretinitis

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ABSTRACT

Purpose: To report a case of varicella zoster virus associated neuroretinitis confirmed via polymerase chain reaction analysis of ocular fluid.

Observations: A 30-year-old man presented with a 1-week history of decreased vision in his left eye and ulcerative skin lesions above his left eyebrow. On exam, he had clinical findings consistent with neuroretinitis characterized by optic disc edema and formation of a macular star. Polymerase chain reaction analysis of aqueous fluid was positive for varicella zoster virus. He was treated with oral valacyclovir with excellent resolution of his symptoms and clinical findings.

Conclusions and importance: Varicella zoster virus is a rare cause of neuroretinitis. We report for the first time a case of varicella zoster virus associated neuroretinitis confirmed by polymerase chain reaction analysis of ocular fluid. Molecular testing of ocular tissue may lead to a definitive diagnosis.

1. Introduction

Neuroretinitis is a rare disease entity characterized by unilateral vision loss, optic disc edema, and macular star formation from lipid exudates. It is thought to be governed by an infectious or immune-mediated process that may be precipitated by various agents. *Bartonella henselae* and *quintana* are organisms most commonly associated with neuroretinitis; however, others include toxoplasmosis, syphilis, lyme, and tuberculosis.[1–5] Neuroretinitis has also been associated with systemic diseases such as sarcoidosis, inflammatory bowel disease, and polyarteritis nodosa.[6–8]

Varicella zoster virus associated neuroretinitis (VZVAN) has always been a presumptive diagnosis based on serology or presence of zoster-like cutaneous lesions.[9–12] To the best of our knowledge, we report for the first time a case of VZVAN confirmed by polymerase chain analysis of ocular tissue.

2. Case report

A 30-year-old man was referred to our clinic for a 1-week history of blurry vision of his left eye. He noted a cluster of painful vesicular skin lesions above his left eyebrow a week prior to his visual symptoms. His past ocular history was unremarkable. His medical history was pertinent for having chickenpox as a child. Visual acuity was 20/20 and 20/50 in the right and left eyes, respectively. No afferent pupillary defect was appreciated and normal intraocular pressures were noted in both eyes. A cluster of crusted ulcerative cutaneous lesions above his left eyebrow was present. Anterior segment examination of the left eye showed diffusely distributed stellate keratic precipitates and 2 + cell in the anterior chamber (AC). Fundus examination of the left eye revealed clear vitreous, optic disc edema with hemorrhage, and a macular star (Fig. 1A). No retinal lesions were noted. Optical coherence tomography (OCT) showed thickening of the nasal macula, intraretinal fluid, and exudates contiguous with the optic disc (Fig. 1B). With the clinical diagnosis of neuroretinitis, he was started on oral valacyclovir 2 g three times a day, oral azithromycin 500 mg on day 1 and 250 mg on days 2–5 and topical prednisolone acetate 1% ophthalmic suspension with a tapering schedule. Laboratory results were negative for rapid plasma reagin, fluorescent treponemal antibody absorption test, Quantiferon-Gold TB, *Bartonella henselae* IgM, and human immunodeficiency virus antibodies. *Bartonella henselae* IgG results were equivocal at a titer of 1:64. An aqueous sample from the left eye was sent to the University of Washington, Seattle, for pan-bacterial, pan-fungal, cytomegalovirus (CMV), herpes simplex virus type 1 (HSV1), herpes simplex virus type 2

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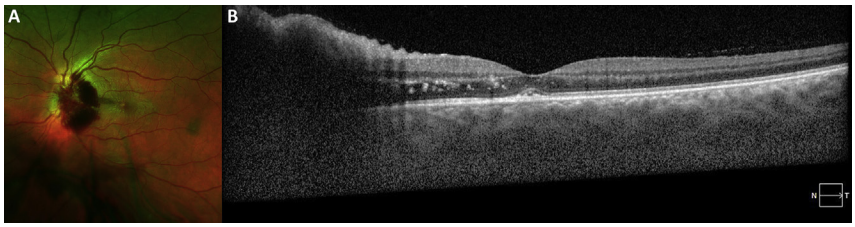

Fig. 1. Initial Presentation of VZVAN. Fundus photograph of the left eye (A) shows optic disc edema with surrounding hemorrhages and the formation of a partial macular star. OCT (B) shows retinal thickening, intraretinal fluid, and exudates.

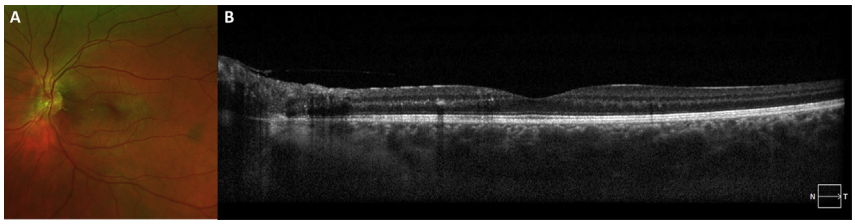

Fig. 2. Resolution of Neuroretinitis 7 Weeks After Initial Presentation. Fundus photograph of the left eye (A) shows resolving optic disc edema with residual exudates. OCT (B) shows resolved macular edema and few intraretinal exudates.

(HSV2), and VZV polymerase chain reaction (PCR) analysis, which yielded a positive result only for VZV.

At his 7-week follow up visit, his visual acuity was 20/20 in the left eye. He did note a small scotoma slightly to the left of his central vision. He had a quiescent AC along with resolution of disc edema and macular thickening (Fig. 2A**).** OCT imaging reflected these changes (Fig. 2B). Valacyclovir was reduced to a maintenance dose of 1 g a day. Eight months after his initial presentation, his exam remained stable.

3. Discussion

Neuroretinitis is an inflammatory disorder characterized by optic disc edema and formation of a macular star from lipid exudates. It has been closely linked to infectious agents such as *Bartonella henselae* and *Toxocara canis*.[13] We are aware of only four reported cases of varicella zoster virus associated neuroretinitis (VZVAN) in adults. For each, a presumptive diagnosis was made with either serology or the presence of typical VZV skin lesions that appeared in temporal proximity to the neuroretinitis.[9–12] We report a case of VZV neuroretinitis confirmed via PCR analysis of aqueous fluid.

Our case is of particular interest because our patient had *Bartonella henselae* IgG serology titers that were equivocal. However, he tested negative for IgM levels, which should be elevated in the acute phase. He also had the typical cutaneous vesicular lesions consistent with VZV. Most importantly, PCR testing of his aqueous fluid was negative for *Bartonella henselae.*

It was noted that both our patient's brother and father had a history of shingles at around 30 years of age. Family history is a known risk factor for shingles.[14] Furthermore, the risk increases with multiple blood relatives. Whether family history plays a role in VZVAN requires further investigation.

Given the rarity of VZVAN, there are no definite guidelines for management. Previous reports included the use of systemic anti-viral medications (acyclovir, valacyclovir), steroids, and observation.[12] Favorable outcomes with visual acuities of 20/25 or better were reported in all cases. Our patient received valacyclovir at a dosing regimen similar to that used in acute retinal necrosis.[15] His visual acuity improved from 20/50 to 20/20 in the affected eye; however, whether this resulted from therapy or was the natural course of the disease is difficult to ascertain.

4. Conclusions

To our knowledge, this is the first report of VZVAN confirmed with PCR testing. VZV may be a cause for neuroretinitis in immunocompetent individuals. Molecular biology testing of ocular tissue may be helpful in arriving at a definitive diagnosis.

Patient consent

The patient consented to publication of the case in writing.

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Conflicts of interest

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Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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