

Varicella-zoster virus-induced orbital apex syndrome with superior ophthalmic vein occlusion and malignant intraocular pressure rise



Orbital apex syndrome from varicella-zoster virus (VZV) is extremely rare, and approximately 20 patients worldwide have been reported with this condition.¹ We report a patient with VZV-associated orbital apex syndrome and unusual malignant intraocular pressure rise from superior ophthalmic vein (SOV) thrombosis.

A 58-year-old South Asian woman presented emergently with right-sided headache, tearing, and vomiting. Past medical history included undifferentiated connective tissue disease (positive anti-nuclear antibodies and rheumatoid factor). Medications included hydroxychloroquine (200 mg PO daily) and prednisone (7.5 mg PO every 2 days). Examination revealed vesicular lesions posterior to the right hairline. Visual acuity was 20/50 OU without correction. Pupillary reflexes were normal. There was no evidence of intraocular inflammation; intraocular pressures were 12 mm Hg OU. Corneas were clear. The patient was pseudophakic OU. Eye movements were full. There was no proptosis. Computed tomography (CT) scan of the head was normal. The patient had neck stiffness, and lumbar puncture was performed. Polymerase chain reaction testing showed VZV present in the cerebrospinal fluid, and the patient was immediately started on acyclovir (700 mg intravenously q8h) for VZV aseptic meningitis and probable herpes zoster ophthalmicus. Forty-eight hours later, the patient developed painful right vision loss to light perception only, with proptosis, conjunctival chemosis, and injection (Fig. 1). There was a dense right afferent pupil defect. Right intraocular pressure was 55 mm Hg. Extraocular movements were painful and limited in all directions. Retinal examination revealed a normal fundus and no optic disk edema.



Fig. 1—Patient's right eye showing inflammation and crusted lesions on skin from varicella-zoster.



Fig. 2—MRI scans. (Top) Right orbit shows optic nerve thickening or inflammation, orbital apex congestion, and myositis. (Bottom) Right orbit demonstrating sludging or obstruction and dilation of superior ophthalmic vein; left superior ophthalmic vein is normal.

The patient was started on intravenous acetazolamide (500 mg bid) with timolol 0.5% and brimonidine 0.2% eye drops bid OD. Repeat CT scan of the orbits and head showed inflammatory congestion at the orbital apex but no cavernous sinus pathology. Orbital apex syndrome was diagnosed, and 1 g intravenous methylprednisolone daily for 3 days only was instituted in addition to her antiviral medications. Starting on day four, 40 mg oral prednisone was given daily. Magnetic resonance imaging (MRI) of the orbits done 24 hours later revealed sludging or thrombosis within the right SOV, optic nerve perineuritis with orbital fat stranding, and myositis affecting all four recti (Fig. 2). Heparin was started intravenously to treat possible SOV thrombosis. Four days after initial presentation, the right intraocular pressure decreased to 15 mm Hg, and acetazolamide was discontinued. Eye movements normalized. A CT venogram to further assess SOV occlusion was normal. Heparin was stopped after 72 hours. Seven days after admission, the patient's right visual acuity had improved to 20/60 with decreased orbital congestion.

The pupil remained fixed and dilated with a reverse afferent pupillary defect. After 7 days of intravenous acyclovir, the patient transitioned to a 14-day course of valacyclovir 1 g PO tid. Prednisone was tapered slowly over 6 months. Gabapentin (400 mg PO tid) was administered for postherpetic neuralgia. Brimonidine 0.2% and timolol 0.5% drops twice daily were continued. The patient was discharged 8 days after admission. One month after admission, the patient presented with worsening right-sided headache, right ptosis, and right facial and arm numbness. Best

corrected visual acuity was 20/30 OU, intraocular pressures were normal, and eye movements were full. The right pupil was fixed and dilated at 6 mm with no afferent pupil defect. Fundus examination was normal. MRI of the brain and C-spine to rule out transverse myelitis was normal.

The patient was discharged after increasing the gabapentin dose to 600 mg PO tid, and a 60 mg oral prednisone bolus was given, followed by a slower taper of the steroid. Valacyclovir was restarted at 1000 mg tid for 48 hours, followed by 1000 mg daily. Six months after the initial admission, the patient's vision remained stable at 20/25 OD with pressures of 24 mm Hg OD and 12 mm Hg OS, and no intraocular inflammation. Her right pupil remained fixed and dilated at 5 mm with no afferent pupil defect. She had slight right optic nerve pallor and mild nasal elevation and residual right ptosis. She continues to be on prednisolone 1% bid, Combigan (Allergan, Markham, Ont.) bid to the right eye, prednisone 5 mg daily, and valacyclovir 1 g daily. Her ocular hypertension is being monitored closely.

Orbital apex syndrome caused by VZV is extremely rare, and cases with SOV dilation are even more rare.² A few patients with VZV orbital disease had anterior uveitis^{2–4} as a possible cause of intraocular pressure rise. The 1 other patient akin to ours, with orbital apex syndrome and SOV dilation, had similar very high intraocular pressure (36 mm Hg). Steroids were not given because that patient was diabetic, and he became completely blind despite maximal intravenous acyclovir treatment.² Our patient had MRI findings compatible with SOV thrombosis—the first report of this in the literature. We postulate that the rapid rise in intraocular pressure was related to obstruction of aqueous outflow from the eye owing to SOV thrombosis or inflammation. There was no angle closure. Prompt intravenous steroid treatment might have hastened recovery, along with heparin anticoagulation. There is only 1 other report in the literature describing VZV-associated orbital apex syndrome and anticoagulant use. That patient had left transverse sinus thrombosis that resolved after 3 months of warfarin therapy. Intraocular pressures were normal in that patient.⁵

The mechanisms of VZV causing orbital apex syndrome are likely multifactorial. Immunocompromised older patients with connective tissue disease are more likely to be afflicted. Antibody–antigen immune complex infiltration into the orbital apex can cause occlusive vasculitis and ischemic injury to the optic nerve and cranial nerves III, IV, V, and VI.^{1,2,6} A direct viral cytopathic effect and compression from swelling and inflammation of structures at the orbital apex also can cause vision loss.^{2,7,8} We recommend prompt systemic treatment with intravenous antiviral medications such as acyclovir and adjunctive intravenous steroids. Little is known about the efficacy of antiviral treatment after a 10-day course⁷; some authors suggest

longer prophylactic treatment to prevent relapse (from 6–12 months).^{1,9}

Steroid tapering regimens vary from 2–12 months depending on patient response.^{1,8} Our patient's antiviral and steroid medications were tapered over 6 months. Close monitoring is critical to successful resolution of VZV-associated orbital apex syndrome.

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Footnotes and Disclosure

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