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Opinion Article

The Efficacy of Prophylactic Vitrectomy in Treating Bilateral Acute Retinal Necrosis in Immunocompromised Patients

Courtney Crawford, MD[1], Monica Botross, BS[2]

[1]*Assistant Professor of Ophthalmology, Burnett School of Medicine at Texas Christian University, USA.*

[2]*Medical Student, Burnett School of Medicine at Texas Christian University, USA.*

Abstract

Purpose: To show that prophylactic vitrectomy is a suitable and effective treatment for patients with bilateral acute retinal necrosis (BARN) at risk of developing retinal detachment (RD).

Design: Case report, literature review

Methods: Optical Coherence Tomography, fundoscopic examination, surgical vitrectomy.

Results: After bilateral prophylactic vitrectomy on an immunocompromised BARN patient, vision significantly improved to 20/60 OD and 20/30 OS and retinal detachment was mitigated.

Conclusion: Prophylactic vitrectomy prevents retinal detachment in progressive BARN patients and may improve visual outcomes.

Keywords: vitrectomy, acute retinal necrosis, retinal detachment, uveitis, Varicella-Zoster-Virus.

Prophylactic vitrectomy has been posed as a potential antidote to the feared complication of retinal detachment (RD) in patients with bilateral acute retinal necrosis syndrome (BARN). The latter is a rare but feared complication of the reactivation of Herpes Zoster Virus, or more commonly, Varicella Zoster Virus. It seldom occurs secondary to Epstein Barr virus and Cytomegalovirus. While most cases of acute retinal necrosis (ARN) are unilateral, up to 30% of patients will develop the disease in the contralateral eye over the course of weeks, and sometimes years (1). Presenting symptoms typically manifest rather rapidly, and include nonspecific complaints including ocular or periocular pain, redness, decreased visual acuity, and photophobia. The mainstay of treatment includes induction with intravenous acyclovir followed by oral antiviral therapy (1). Other supportive therapeutic modalities have been described and include local or systemic steroid treatment, laser retinopexy surrounding necrotic regions, and pars plana vitrectomy with or without silicone oil prior to the development of RD. The latter is a frequent and sight-threatening complication of ARN occurring in 50-75% of cases, mostly within the first three months of disease onset(2).

Several studies have examined the role of prophylactic vitrectomy in treating ARN. In 2022, Fan and colleagues published a systematic review of online databases done for articles between June 1994 and March 2020 that aimed to assess the risk of rhegmatogenous retinal detachment (RRD) and visual outcomes in acute retinal necrosis (ARN) patients (3). The group evaluated thetreatment outcomes of 121 prophylactic vitrectomy subjects and 144 routine antiviral therapy regimen subjects.

Corresponding Author: *Monica Botross, Medical Student, Burnett School of Medicine at Texas Christian University, USA.*

It was found that the risk of RRD in the former group was significantly decreased compared to the latter. However, the prophylactic vitrectomy group was observed to have deteriorated visual outcomes, likely due to the silicone oil tamponade resulting in macular dysfunction and long term complications of the procedure. The authors concluded that careful consideration and comprehensive evaluation of prophylactic vitrectomy should be undertaken prior to the treatment of ARN patients.

When successful, prophylactic vitrectomy can prevent RD and improve the overall prognosis of cases involving rapidly progressive necrosis despite aggressive treatment with antiviral therapy. One study highlighting this is Luo and colleagues' 2012 retrospective analysis which evaluated the therapeutic outcomes of ARN patients treated with routine treatment, consisting of antiviral medication and vitrectomy following RD, and those treated with antiviral medication in addition to prophylactic vitrectomy in the active inflammatory phase (4). At the conclusion of the study, it was found that the extent of necrosis was greater in the routine treatment group than the prophylactic vitrectomy group. The latter treatment paradigm was also found to prevent RD in the majority of diseased eyes, with only 13% of patients in the group developing RD compared to 57% in the routine treatment cohort.

Here we offer a compelling case for the efficacy of prophylactic vitrectomy in the treatment of an immunocompromised BARN patient. A 75 year old caucasian male presented to our office with a rash and decreased visual acuity bilaterally. His medical history is notable for sarcoidosis managed on 10 mg of prednisone daily. He initially developed a painful superficial rash on the right side of the torso and three days later, noticed a rash on the left side of the face that extended to the tip of the nose. His vision became markedly decreased over the next two days and and he presented for evaluation. On examination he had a blistering rash on his torso and face consistent with Herpes Zoster and the Hutchinson sign. Visual acuity was 20/400 OU. Optical Coherence Tomography showed macular edema OD (figure 1) and fundus exam revealed venous sheathing with bilateral retinal hemorrhaging (figure 2). The diagnosis of ARN syndrome was determined and emergent treatment was initiated with intravenous acyclovir and a high dose steroid regimen beginning at 60mg daily with planned slow taper over the course of one month. A prophylactic vitrectomy with laser was performed within one week of presentation in order to prevent retinal detachment and preserve vision. With these interventions, the vision improved to 20/60 OD and 20/30 OS.

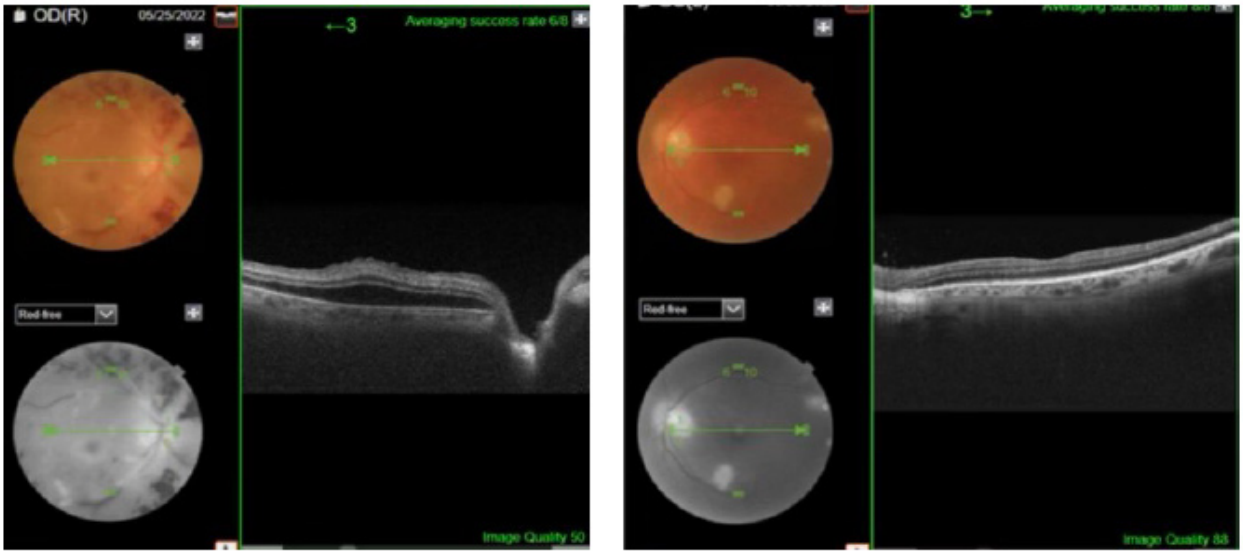

Figure 1. *Optical Coherence Tomography findings prior to bilateral prophylactic vitrecromy. OD (left image) showed macular edema and OS (right image) showed no macular edema.*

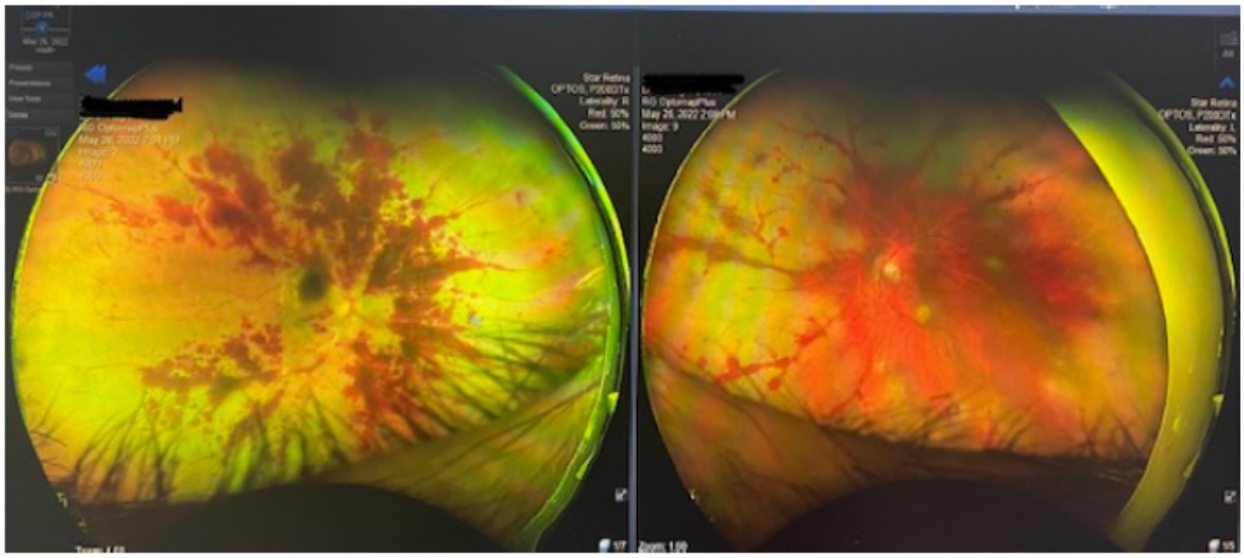

Figure 2. *Fundus photographs of patient's retina. Venous sheathing and retinal hemorrhage present bilaterally with OD (left image) greater than OS (right image).*

The prognosis of ARN is largely dependent on the timeline between onset and treatment. Early intervention and aggressive treatment can reverse vision loss and prevent permanent blindness. However, often times, visual outcomes remain deteriorated irregardless of timely management. In the Luo and colleagues study mentioned previously, 51% of eyes never regained useful vision and 2 eyes became fully blind. These results further support early aggressive surgical treatment of ARN rather than the late performance of a vitrectomy on a fast-deteriorating, diseased retina. Adding support to early prophylactic surgical treatment is Huang and colleagues' retrospective cohort study from 2016 which concluded that early prophylactic vitrectomy within 30 days of ARN onset may prevent retinal detachment (5). The study examined two cohorts; those who underwent vitrectomy within 30 days and those who did not undergo any surgical treatment. It was found that 25% of subjects in the former group developed RD compared to 59% in the latter g77roup. Despite the limitations of a small sample size and lack of a randomized controlled experiment, the vast difference in disease outcomes between the two groups points with a certain degree of validity to the efficacious role of prophylactic vitrectomy in ARN treatment.

Performing prophylactic vitrectomy greatly improved our patient's visual outcomes and prevented the feared complication of RD. Because our patient was immunocompromised, it was especially important that aggressive measures be taken to preserve sight and prevent rapidly progressive disease complications. In light of this case, as well as other reported cases and research studies examining the treatment outcomes of patients undergoing this intervention, we propose that prophylactic vitrectomy is a reasonable option available to vitreoretinal surgeons that may help prevent future retinal detachments and vision loss in ARN patients.

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