

CASES THAT CHANGED THE WAY WE PRACTICE

Three retina specialists share stories of patient encounters that left lasting impressions.

LET THERE BE LIGHT



By Ninel Z. Gregori, MD

A 52-year-old patient who had seen nothing but weak light for 19 years since devel-

oping end-stage retinitis pigmentosa (RP) came into my care. Then, in 2013, the long-awaited promise of artificial vision became a reality because the US FDA had approved the first retinal prosthesis for patients with RP. I discussed the Argus II Retinal Prosthesis System (Second Sight) with the patient, and we agreed that she was a good candidate to receive the implant.

A BASCOM PALMER FIRST

After a visit to the University of Southern California to watch Mark Humayun, MD, PhD, and Lisa Olmos de Koo, MD, MBA, implant an Argus in a patient, I drafted my own surgical protocol with diagrams and sketches and was ready to lead my surgical team on our first case at Bascom Palmer in 2014.

The surgery lasted more than 4 hours, but everything went as planned. After the patient had healed for several weeks, we programmed the retinal prosthesis and turned it on. The patient was mesmerized and simultaneously confused by the new fluttering lights she saw. Artificial

vision requires daily practice and hard work. The patient had an intense rehabilitation process ahead of her to help her to make sense of the lights. She is now able to identify light objects against dark backgrounds, sort light and dark clothes, see light coming in the windows, identify the handle on the refrigerator, and even identify some letters, numbers, and simple words on a computer screen. She cannot, however, recognize objects and people in the environment consistently, see faces, or read. At times, she is frustrated with the limitations of bionic vision and the mental exhaustion she feels while using the Argus II for activities associated with daily living.

ONE CASE, MANY LESSONS LEARNED

For me as a retina surgeon, it was incredibly rewarding to be able to treat a patient with an irreversibly blinding condition who had previously had no therapeutic options. It was a unique opportunity to develop a close personal connection with the patient and her family through frequent communication at the institute and via emails and telephone. In addition, this groundbreaking procedure pushed my limits as a surgeon, opened my mind to continuous learning, and launched

my career in the direction of other innovative surgeries and clinical trials at Bascom Palmer.

And it did much more: It helped me truly understand and appreciate the value of careful preoperative counseling and setting realistic expectations for patients undergoing new treatments. After observing the experiences of my patient receiving an Argus II implant, I now make sure to carefully explain the risks and limitations of artificial vision options to patients who are interested in the technology.

When speaking to the patients enrolled in the choroideremia gene therapy trials at Bascom Palmer, for example, I make sure they understand the risks involved: that their vision may or may not improve, that the goal is to preserve what vision they have, and that the surgery has its own risks, which we of course minimize to the best of our abilities.

This experience has also helped me to better educate the patients in my daily clinical practice. No matter how routine a vitrectomy or cataract surgery may seem to the surgeon, there are always risks involved, and we cannot eliminate those risks completely. Thus, we must always carefully inform and educate patients before we take them into the OR.

TEAMWORK MAKES THE DREAM WORK

In 2018, I became one of the surgeons at Bascom Palmer to perform subretinal injections of the first FDA-approved ocular gene therapy, voretigene neparvovec-rzyl (Luxturna, Spark Therapeutics), for treatment of Leber congenital amaurosis or severe early onset RP due to biallelic mutations of the *RPE65* gene. Participating in gene therapy and stem cell therapy trials at Bascom Palmer years after completing my vitreoretinal fellowship opened my mind to incorporating input from others regarding my surgical technique.

It taught me to keep my mind open when listening and to consider the expertise of others, while at the same time trusting my own abilities as a surgeon. Participating in these trials has also helped me to understand that a team approach with talented junior and senior colleagues is the ultimate path to surgical excellence and better outcomes for patients.

It is important to continue to evolve throughout our careers. Since that first patient, I have implanted three more Argus devices and have participated in gene therapy for

31 patients as part of phase 1/2 and phase 3 gene therapy trials, learning new subretinal injection techniques and designing safer, more controlled surgical approaches. I look forward to performing more innovative surgeries as my lifelong learning continues.

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■ Financial disclosure: Grant Support (Nightstar Therapeutics)

AN UNUSUAL PRESENTATION OF HORV

**By Tarek S. Hassan, MD**

I have been in clinical practice for more than 20 years, and I still try to learn something

new each time I am in the office or OR. However, it has been quite a while since a case has fundamentally changed how I manage patients as much as the one I detail below.

A STRAIGHTFORWARD CASE OF ENDOPHTHALMITIS?

Two years ago, a 60-year-old obese and hypertensive man was referred to me with pain and decreased vision (20/200) in his right eye 3 days after uncomplicated cataract extraction. His medical history was unremarkable. At presentation, his eye displayed injection and he had a mild subconjunctival hemorrhage. He had 2+ cells, trace fibrin in the anterior chamber, and no hypopyon. His fundus was visible, although the view was slightly hazy. We noted a few scattered intraretinal hemorrhages in the posterior pole but otherwise noted no remarkable findings. We made a diagnosis of endophthalmitis and proceeded with a vitreous tap and injection using 1 mg of vancomycin and 2.25 mg of ceftazidime per our usual protocol.

Later that evening, the patient called complaining of worsening pain and decreased vision. He was examined within an hour and was found to have increased anterior chamber fibrin, more vitreous opacities, a poorer view of the posterior segment, and visual acuity that had decreased to 20/800. He was reassured that often after injection of antibiotics for endophthalmitis there is a short period when the clinical picture appears worse because of increased inflammation. Topical steroids were increased. No gram stain report was yet available from the vitreous tap done a few hours earlier.

RECONSIDERING THE DIAGNOSIS

The patient returned the next day with no relief of his pain, a rise in IOP to 30 mm Hg, increased corneal edema, and vision that had dropped to hand motions. B-scan ultrasonography showed that the retina was attached and there was only *mild* vitritis. At only 1 day after the tap and inject, we were concerned about his worsening clinical picture and discussed the possibility of repeat antibiotic injection but more likely vitrectomy. The patient had postcataract endophthalmitis with hand motions vision. The Endophthalmitis Vitrectomy Study

(EVS) would recommend continued observation over vitrectomy. But the significant pace and worsening severity of symptoms, even over the course of 1 day, gave us pause. The patient returned the following day, less than 48 hours after initial presentation, with light perception vision, unchanged pain, and an anterior chamber with more fibrin but no hypopyon (Figure 1). B-scan still demonstrated only mild to moderate vitritis.

We proceeded with vitrectomy later that evening, which began with removal of the prominent central fibrin clot. With our improved view, we found a nearly confluent hemorrhagic retinitis with no retinal detachment and only mild vitreous inflammatory debris (Figure 2). We diagnosed hemorrhagic occlusive retinal vasculitis (HORV).

We completed a simple vitrectomy and sent vitreous fluid for bacterial and fungal cultures, universal bacterial and fungal primer polymerase chain reactions, viral polymerase chain reactions for herpes simplex virus, varicella zoster virus, and cytomegalovirus, and pathologic evaluation. All of these studies were negative. We initiated a uveitis workup for common inflammatory and infectious causes of retinal vasculitis, and this was also entirely negative.

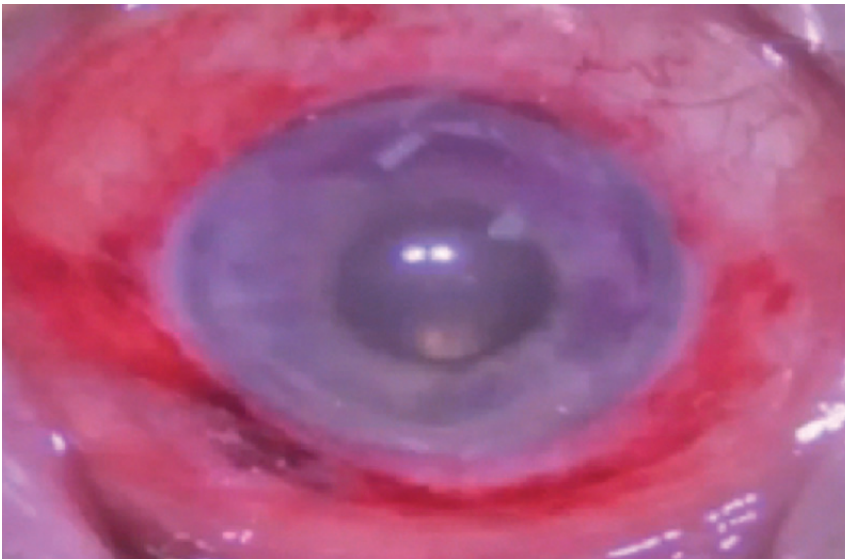


Figure 1. Appearance of the patient's right eye on day 2.

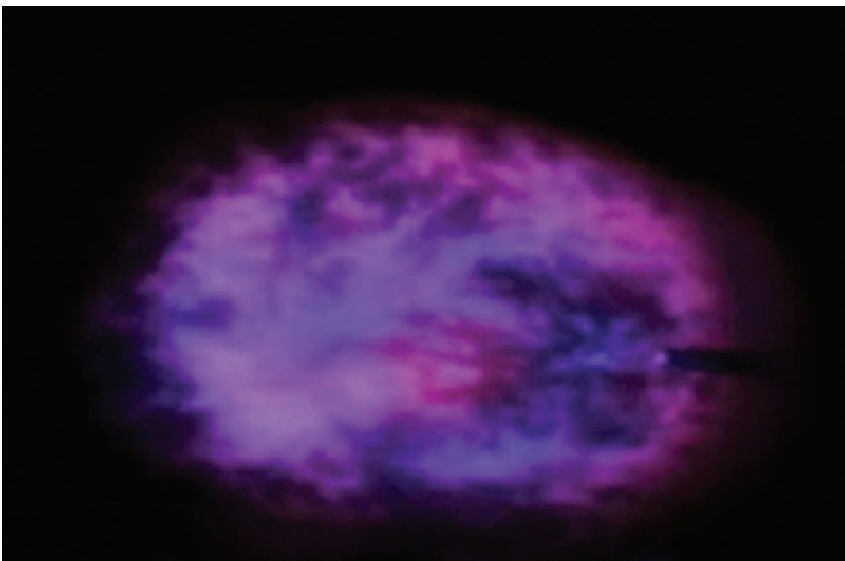


Figure 2. Intraoperative appearance showing a nearly confluent hemorrhagic retinitis with perivascular retinal whitening.

FOLLOWING UP

A week after vitrectomy, fluorescein angiography showed nearly complete occlusion of the retinal vasculature in both the macula and the periphery. Despite being treated with aggressive topical and systemic steroids, the patient developed intractable eye pain, and, despite having light perception vision, he requested enucleation within 2 weeks after initial presentation, which was carried out.

The eye was examined pathologically

and found to have a diffusely necrotic iris, severe hemorrhagic necrosis of the ciliary body, thickening of the choroid with lymphocytic infiltration of the entire posterior uvea, and diffuse hemorrhagic and fibrinoid necrosis of the retinal vessels without vasculitis of the retina itself. My colleagues and I reported this case and these first ever histopathologic findings of the entity known as HORV and emphasized that its pathophysiology is complex, highlighted by a necrotizing retinal

vasculopathy without vasculitis, chronic nongranulomatous choroiditis, and an unusual glomeruloid proliferation of endothelial cells in the choroid and elsewhere in the eye, rather than an overt retinal vasculitis, which had traditionally been expected but never actually verified pathologically.¹

RETRACING OUR STEPS

At presentation, this patient appeared to have routine postcataract endophthalmitis. Our standard protocol, like that of most retina specialists, is to perform a vitreous and/or anterior chamber tap and injection of vancomycin and ceftazidime. We had not contacted the patient's cataract surgeon initially, but did so after the vitrectomy. He informed us that he used intracameral vancomycin during his surgery. I am concerned that our second dose of intravitreal vancomycin may have compounded the effects of the initial vancomycin, thereby worsening the severity of the patient's HORV.

There had been no prior reports of an endophthalmitic form of HORV in the literature, and thus we did not suspect it at initial presentation. Although we saw a couple of mild intraretinal hemorrhages at the initial visit, they looked nothing like that described in the classic HORV presentation. Thus, we did not specifically ask the cataract surgeon if he had used intracameral vancomycin before initiating our intravitreal antibiotic treatment. We also waited a day or so longer than may have been ideal before taking the patient to vitrectomy because his vision was better than light perception (the threshold suggested for intervention by the EVS), his pain was stabilized, and we thought some of the immediate visual decline was due to increased corneal edema and anterior chamber fibrin. This delay may have prolonged the effects of severe anterior segment ischemia that caused persistent, significant pain. We were swayed more by the old EVS dogma and the fact that there can be an initial clinical worsening in both

the anterior and posterior chamber after intravitreal antibiotic injection in endophthalmitis eyes than we were alarmed by the rapid pace of decline and persistent pain in this patient's eye.

LESSONS LEARNED

Because of this case, I have changed my approach to managing patients with severe postsurgical posterior segment inflammation and/or infection. Here are the lessons I learned from this particular case:

- There is no such thing as “routine” endophthalmitis.
- HORV can mimic bacterial endophthalmitis.

• In cases of suspected postsurgical endophthalmitis, always ask the referring surgeon if intraocular vancomycin was given at the time of cataract extraction.

• If I do not see the posterior pole with any significant detail to determine if hemorrhages are present within 24 hours of intravitreal antibiotic injection—in the face of notable worsening of vision or other clinical findings—I am now much more likely to take the patient to vitrectomy (even with vision appreciably better than light perception) rather than follow old guidelines from the EVS, a study done in an era prior to safer,

more straightforward small-gauge vitrectomy techniques, with results that may not be applicable today.

1. Todorich B, Faia LJ, Thanos A, et al. Vancomycin-associated hemorrhagic occlusive retinal vasculitis: a clinical pathophysiological analysis. *Am J Ophthalmol*. 2018;188:131-140.

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THE PILOT AND THE PRISONER



By Michael A. Klufas, MD

As a physician at Wills Eye Hospital, I treat a lot of retinal detachments, which isn't too

surprising, given that it is a regional and worldwide referral center. Often, when a vitreoretinal procedure becomes common, it's easy to take the operative approach or steps of the procedure for granted. That's why, every time I step into the OR, I carry two pieces of advice from training with me.

The first is from a mentor who once told me, “Every retinal detachment is like a snowflake; they are all a little bit different.” The second is one that I always share with my fellows when we have many add-on cases that go into the evening: “We always do a good job for every patient, even if it is late.”

Below I share two cases that have had lasting effects on the way I practice. The first highlights the importance of never applying all the same rules

to retinal detachments. The second touches on the ethics of patient care.

MAKE TIME FOR NECESSARY TREATMENT

I have heard other retina surgeons express relief over a macula-off case, saying they can simply work it into their next scheduled OR day. I prefer to determine the urgency of operative repair based on how long the macula has been off to ensure the best outcome. If the macula came



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off 1 day ago, I like to go to the OR within 1 day. If it has been off for 7 days, for example, then I schedule time in the OR within 1 week.

I recently treated a commercial airline pilot who had started a series of flights and was on his way back to the East Coast when he noted a curtain in his vision. After he landed in Philadelphia, he came to the Wills Eye Emergency Department and presented with a recent macula-off retinal detachment with counting fingers vision. My fellow, Katherine Talcott, MD, saw the patient that Friday evening, and I knew we had to get the macula back on as quickly as possible to give him every chance to regain vision so he could continue to pilot. I also knew that Saturday's OR schedule was packed with six cases. The patient was phakic and had multiple superior breaks and inferotemporal breaks in the affected eye. I opted to proceed with a buckle vitrectomy using 25% SF₆ gas tamponade to maximize the chance of single-surgery success and to limit the chance of his developing a progressive cataract.

Within 2 weeks, our patient's vision was back to 20/25 in the affected eye, which we considered a success. After phacoemulsification and IOL implantation 6 months later, the patient's vision was 20/20, enabling him to return to flying the friendly skies. I recently saw this patient, and he says he plans to fly for another 20 years.

This case was a reminder that not every macula-off detachment should necessarily be "done within 1 week." We have to use our best judgment for each patient with a retinal detachment and take careful note of the preoperative, intraoperative, and postoperative decisions that affect patient outcomes. Read more about this case at: willseye.org/patient/i-am-back-piloting-airliners/.

ALWAYS PUT THE PATIENT FIRST

On another occasion, a federal prisoner was brought to Wills Eye Hospital to have a retinal detachment treated. The prison required the



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presence of armed guards in the OR and just outside the OR area. The patient's retinal detachment repair was to be performed under general anesthesia. After he was under anesthesia, one of the OR staff asked one of the armed guards if he could tell us why the patient was incarcerated, given the unusually high amount of security. While in my mind there is no question that a patient's social history should have no impact on the quality of care he or she receives, my fellow, Christopher M. Aderman, MD, immediately spoke up, saying, "No, we cannot have the answer to this question. It is unethical."

Chris explained his reasoning: that, even though we as medical practitioners may think we would not treat the patient any differently, we cannot always predict or guarantee our subconscious decision-making. Of course he was right, and we treated and released the patient, never knowing what sort of crime he had committed.

ABOVE ALL, DO YOUR BEST

For patients with retinal detachments, the stakes are high with the first intervention, as the vitreoretinal surgeon has the opportunity at this point to restore vision. It is a great privilege to have this ability, and many of the retinal detachments I have treated over the past several years continue to reinforce the need to take an individualized approach to each case and to always do the best for each patient, regardless of the situation. ■

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- Financial disclosure: None