

Her “Bad Eye” Kept Getting Worse . . . and Worse

Polly Jones,* a 43-year-old woman, had noticed some discomfort in her right eye for a few days. Her right eye was her “bad eye,” so she wasn’t alarmed at first. However, after a few weeks of progressive injection, swelling, and pain, Ms. Jones decided that it was time to see her ophthalmologist.

We Get a Look

Presentation. When Ms. Jones presented to our ophthalmology clinic, she noted pain and redness in her right eye. She had not experienced any photophobia or changes in vision, and she said that her left eye was stable.

History. Ms. Jones had a history of herpes simplex keratitis in the right eye that had caused persistent corneal stromal scarring and inflammatory glaucoma. This condition ultimately required implantation of an Ahmed Glaucoma Valve in 2015 for IOP control.

Ms. Jones’ herpetic keratitis had been clinically stable for the past several years on a maintenance dose of oral acyclovir. She was not using any other systemic or ocular medications and had no significant past medical history. She also said that she had no history of trauma.

During Ms. Jones’ last follow-up visit to the ophthalmology clinic six months earlier, it was noted that she had a possible suture granuloma over the plate of her drainage implant. She had been scheduled for a bleb revision,

but the procedure was postponed due to the COVID-19 pandemic. She had not returned until this urgent visit.

Exam. Ms. Jones’ BCVA was stable at 20/300 in the right eye and 20/20 in the left. Her IOP was 20 mm Hg in the right eye and 15 mm Hg in the left. No afferent pupillary defect or ocular motility disturbances were present.

The slit-lamp examination showed significant swelling of her right upper eyelid. The conjunctiva of her right eye was diffusely chemotic and injected, with more severe injection directly over the plate of the tube shunt. Seidel testing of the conjunctiva along the length of the plate and tube was negative for leakage, and the previously noted suture granuloma could not be visualized. The cornea had stable scarring from past herpetic keratitis, and the anterior chamber and vitreous were quiet. The left eye exhibited no acute findings.

Initial management. Although the etiology of Ms. Jones’ inflammatory process was unknown, we started her on prednisolone acetate 1% and moxifloxacin 0.5% four times a day in the right eye because of our concern about a possible tube shunt–related infection. We also referred her for an updated cornea evaluation to confirm that she was not having occult reactivation of her past herpetic eye disease.

Early improvement. When she returned for follow-up the next day, Ms. Jones reported improvement in



CLINICAL VIEW. Preoperative appearance of chemotic hemorrhagic tissue over the Ahmed plate.

her symptoms. Her cornea evaluation revealed stable, chronic corneal scarring consistent with previous disease, and no signs of active infection. We continued her on the prednisolone and moxifloxacin regimen four times a day, and she was followed closely with gradual improvement.

A turn for the worse. Despite this apparent success, three weeks after her initial visit, Ms. Jones returned to the clinic with worsening pain, diffuse conjunctival injection, and chemosis as well as new-onset bloody tears. Her vision was still stable, but her IOP was now 6 mm Hg in the right eye.

The conjunctiva over the plate was now Seidel positive for leakage, and a new subconjunctival hemorrhage without purulence had developed (Fig. 1).

Differential Diagnosis

Our differential diagnosis included the following:

- late infection of glaucoma drainage implant due to plate suture erosion

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and subsequent tube exposure

- tube erosion with subsequent infectious bacterial endophthalmitis
- bacterial conjunctivitis with subsequent tube erosion
- herpetic keratoconjunctivitis
- idiopathic orbital inflammation

Given the absence of purulence and intraocular inflammation, the underlying diagnosis at this point was unclear.

Prompt Action Needed

Nevertheless, the conjunctival erosion needed to be addressed promptly. The location of the erosion warranted surgical treatment, as management with a bandage contact lens and antibiotic drops was unlikely to repair the defect. A simple tube revision with an allograft pericardium patch graft (Tutoplast) was unlikely to provide a long-term solution because of the location of the exposure. Thus, we decided to take Ms. Jones to the operating room for an exploration and tube shunt explantation.

Making the Diagnosis

In the OR, we immediately noticed significant subconjunctival hemorrhage without purulence. The explanted plate was sent to pathology, and the hemorrhagic fluid was also plated for culture. At the end of the procedure, Ms. Jones was given subconjunctival cefazolin and dexamethasone, and the previous regimen of moxifloxacin and prednisolone was restarted.

To our surprise, the culture plates grew florid pansensitive *Staphylococcus aureus* (Figs. 2A, 2B). We then added oral cephalexin to Ms. Jones' topical regimen. Her symptoms and findings improved markedly within a few days of shunt explantation. By one month after surgery, all acute findings had completely resolved. Ms. Jones was tapered off her medications, and her IOP has remained controlled despite removal of the tube shunt.

Discussion

Tube shunt infection is a rare complication of tube shunt surgery. It is far less common than early and postoperative hypotony, capsular fibrosis, and tube or plate erosion.¹ Furthermore, tube infections typically present with some



CULTURES. (2A) Blood agar plate shows clusters of golden colonies; (2B) chocolate agar plate shows yellow pigmented colonies; these findings are characteristic of *S. aureus*.

combination of injection, tenderness, or discharge and often display Seidel positivity somewhere along the length of the tube or plate. Our patient presented atypically, with diffuse injection and chemosis and no signs of Seidel positivity until later in the course of the infection.

Glaucoma drainage implant infections are more commonly related to erosion at the tube rather than the plate. Combined tube or plate erosions occur at a rate of 1% to 2% per year and increase the risk of infection. Tube exposure is more likely to occur in eyes with ocular inflammation, steroid use, prior ocular surgery, concomitant surgery, inferior placement, and smoking.^{1,2} If the tube becomes exposed again after repair of a primary tube erosion, there is an even higher risk for infection. Reported risk factors for re-exposure include Caucasian race and use of non-scleral patch grafts.³

Careful slit-lamp examination of the conjunctiva in an eye with a tube shunt is imperative at every visit to detect any erosion or leakage. Medical management is rarely effective, and surgical revision is generally required.^{4,5}

Proper rotation of the suture plate knot can help avoid late erosion and infection. Any exposed suture must be removed to avoid development of a nidus of infection and potential biofilm formation, which can lead to reduced topical antibiotic efficacy.

In our patient, unplanned delay of surgical revision due to the pandemic led to an occult infection that

was difficult to recognize. Only after explantation and culture plating of the hemorrhagic fluid did we discover that the tube shunt was infected with *S. aureus*.

*Patient's name is fictitious.

1 Sarkisian SR Jr. *Curr Opin Ophthalmol.* 2009; 20(2):126-130.

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3 Thompson AC et al. *J Glaucoma.* 2017;26(12): 1155-1160.

4 Gedde SJ et al. *Am J Ophthalmol.* 2007;143(1): 23-31.

5 Divya D et al. *BMJ Case Rep.* 2021;14(9):e244073.

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