

Bacterial Infectious Scleritis: A Case Report

Qianqian Liang¹⁻³, Yuerong Wang¹⁻³, Xiubin Ma¹⁻³

¹Eye Institute of Shandong First Medical University, Qingdao Eye Hospital of Shandong First Medical University, Qingdao, People's Republic of China;

²State Key Laboratory Cultivation Base, Shandong Key Laboratory of Eye Diseases, Qingdao, People's Republic of China; ³School of Ophthalmology, Shandong First Medical University, Qingdao, People's Republic of China

Correspondence: Xiubin Ma, Qingdao Eye Hospital of Shandong First Medical University, Qingdao, 266071, People's Republic of China, Tel +86-0532-85876380, Email maxiubin2005@126.com

Purpose: To report the outcomes of a case of bacterial infectious scleritis managed with thorough debridement and antibiotic irrigation therapy.

Observations: A patient presented with severe infectious scleritis secondary to *Pseudomonas aeruginosa* subsequent to cataract surgery. The scleral abscess was cleaned completely and rinsed with ciprofloxacin every day in the treatment room. Over the next week, the conjunctival and scleral wounds healed. The patient's condition was observed to be stable over the next 3 months, and the uncorrected vision acuity in the treated eye improved to 0.22 logMAR.

Conclusions and Importance: This case highlights the utilization of thorough debridement and antibiotic irrigation to preserve the globe and good vision while treating severe infectious scleritis.

Keywords: infectious scleritis, *Pseudomonas aeruginosa*, thorough debridement, antibiotic irrigation

Introduction

Infectious scleritis (IS) is a rare and severe ocular disorder responsible for approximately 5–10% of all scleritis cases,¹ with *Pseudomonas aeruginosa* (*P. aeruginosa*) the most prevalent microorganism associated with its onset.² Among the types of IS, the most common is bacterial scleritis. In these cases, bacteria usually invade the sclera during ocular surgery or trauma. Through this route, IS can arise after cataract surgery. Although postoperative bacterial scleritis is not very rare, due to the difficulty of ensuring its timely diagnosis and cure, multiple surgeries are often required over the long term to treat the infection, and eye enucleation may even be necessary to prevent orbital cellulitis. In our clinical practice, a case of *P. aeruginosa* scleritis was diagnosed after non-traumatic cataract surgery and cured after a single surgery. Good vision was ultimately preserved, as we report herein.

Case Report

A 69-year-old man with a history of diabetes, hypertension, and vitrectomy presented with severely poor vision (3.0 logMAR, hand motion), lens opacity, and nuclear hardness grade 5 (LOCTS II grading standard) in his left eye (Figure 1). The patient had been diagnosed with type 2 diabetes about 30 years prior, and with insulin and drug treatment, his blood glucose control was satisfactory. The patient's HbA1c level before surgery was 6.7%. He also had a 15-year history of hypertension, though his blood pressure was regulated with oral medication. Approximately 3 years ago, the patient underwent vitrectomy for vitreous hemorrhage due to diabetic retinopathy at another hospital. The vitreous cavity was filled with gas after the surgery, and his vision improved about half a month after the procedure.

In July 2023, the patient underwent cataract extraction combined with intraocular lens implantation, performed via nasal clear corneal incision (2.5 mm) and 2-point temporal clear corneal incision (1 mm), under the standard disinfection strategy at Qingdao Eye Hospital of Shandong First Medical University. The patient had no eye pain, and his uncorrected vision acuity was 0.82 logMAR on the first postoperative day. The operated eye was administered both topical prednisolone 1% eye drops and gatifloxacin 0.3% eye drops four times per day, as well as tobramycin and dexamethasone eye cream once at night.

At the 1-week postoperative assessment, the patient complained of pain in the operated eye. Upon examination, we found that the uncorrected vision acuity of the eye had decreased to 3.0 logMAR. The operated eye had obvious conjunctival chemosis, ciliary congestion, and a moderate intraocular reaction in the anterior chamber with grade 2+ cells

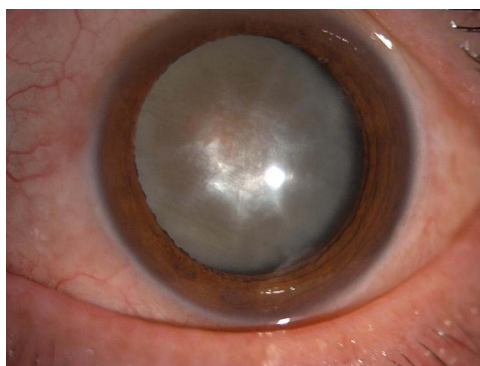


Figure 1 Photograph of lens opacity. The lens is severely cloudy, with nuclear hardness grade 5.

and no hypopyon. There was mild infiltration by inflammatory cells in the vitreous identified with B-scan ultrasound. The optic nerve and large retinal vessels could be seen, but other details of the retina were not visible under wide-angle fundus photography, indicating acute postoperative endophthalmitis (Figure 2).

The eye was treated with systemic (cefuroxime, intravenous drip) and topical antibiotics (gatifloxacin 0.3%, tobramycin, and dexamethasone eye drops administered once every 2 hours). According to Chinese expert consensus on the diagnosis and management of infectious endophthalmitis after ophthalmic surgery,³ the anterior chamber was irrigated with ceftazidime 2% and vancomycin 1%, and the vitreous cavity was injected with vancomycin 1 mg/0.1 mL combined with ceftazidime 2 mg/0.1 mL. Fungal and bacterial cultures of the anterior aqueous humor were negative. However, a bacterial culture of the conjunctival sac was positive for *P. aeruginosa*, and so we administered the sensitive antibacterial agents ciprofloxacin (intravenous drip) and gatifloxacin (topical ocular administration). After 1 week of these treatments, the signs of disease had lessened, and the uncorrected vision acuity of the left eye had improved to 2.0 logMAR (counting fingers), but eye pain was not significantly reduced. The patient was discharged and continued treatment with a topical antibiotic.

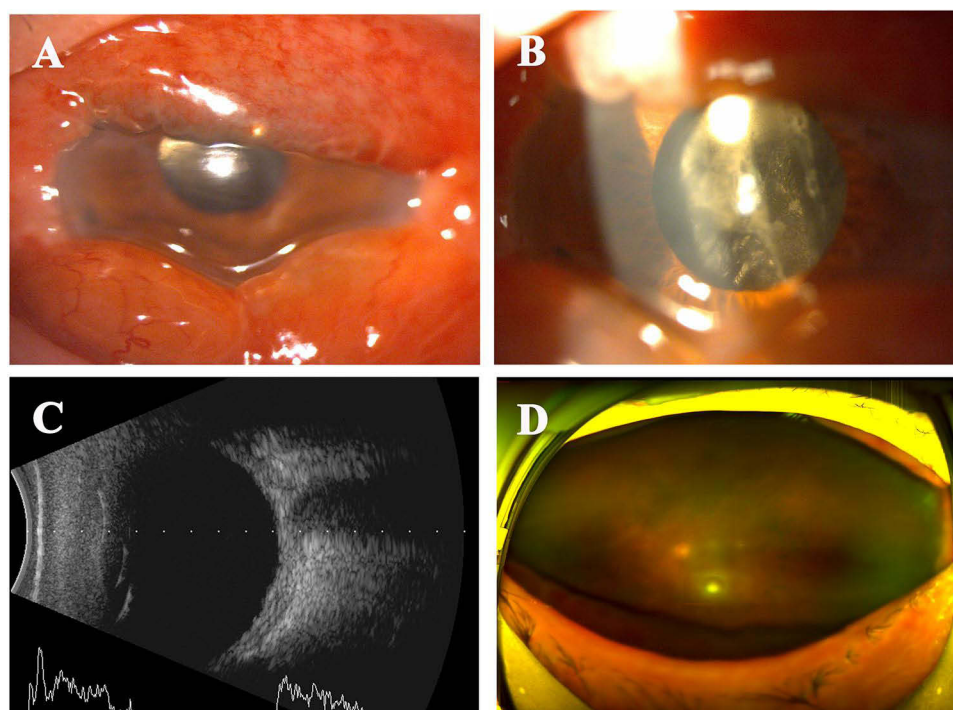


Figure 2 Indications of suspected endophthalmitis, 1 week postoperative. (A and B) The operated eye had obvious conjunctival chemosis, ciliary congestion, and a moderate intraocular reaction in the anterior chamber with grade 2+ cells and no hypopyon. (C) Mild infiltration by inflammatory cells in the vitreous identified with B-scan ultrasound. (D) The optic nerve and large retinal vessels could be seen, but other details of the retina were not visible under wide-angle fundus photography.

The patient was then reviewed 25 days after cataract surgery and 10 days after his discharge, as he still had severe eye pain. We observed a yellow–white abscess under the conjunctiva in the superonasal quadrant of the left eye (Figure 3A). The intraocular condition was not significantly worse than it had been previously. In the operating room, the conjunctiva was found to be intact and had no signs of infection. On opening the conjunctiva, the scleral tissue demonstrated erosion and necrosis, presenting a viscous mucus of about half the full scleral thickness (10×4 mm), extending from 10 to 2 o'clock in position (Figure 3B). We cleaned the necrotic tissue completely and rinsed the wound with ciprofloxacin. The opened conjunctiva was not sutured. A bacteria culture of the necrotic scleral tissue determined the presence of *P. aeruginosa*, and we administered the sensitive antibacterial agents ciprofloxacin and gatifloxacin. The wound was not sutured, but it was cleaned daily. Under topical anesthetic, the pus and exudates on the surface of the wound were removed, and the wound was washed thoroughly using a 20-mL ciprofloxacin injection (0.2 g:100 mL). Over the next 2 weeks, the lesion gradually improved, and the conjunctival and scleral wounds healed. The patient's condition was observed to be stable over the next 3 months, and the uncorrected vision acuity of the left eye improved to 0.22 logMAR (Figure 3C and D). Pathological examination of the scleral tissue revealed chronic inflammation of the fibrous connective tissue (Figure 4).

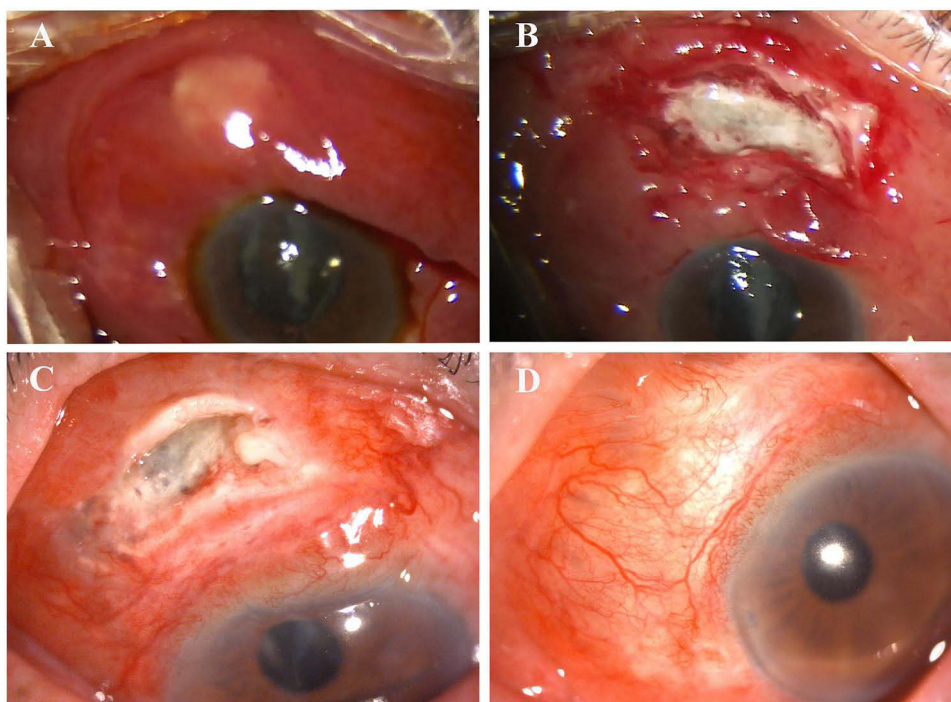


Figure 3 The therapeutic process of infected scleritis. (A) A yellow–white abscess under the conjunctiva in the superonasal quadrant of the left eye. (B) The scleral tissue demonstrated erosion and necrosis, presenting a viscous mucus of about half the full scleral thickness (10×4 mm), extending from 10 to 2 o'clock in position. (C) The wound edges of the conjunctiva had healed 10 days after scleral surgery. (D) The conjunctival wounds had completely healed 16 days after scleral surgery.

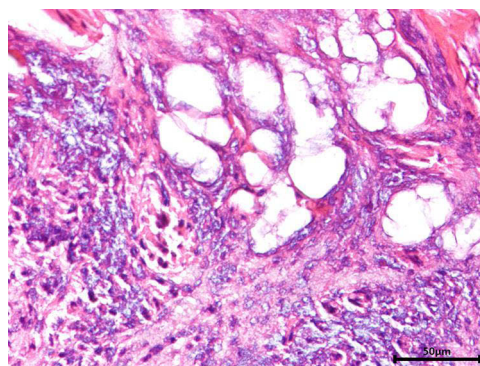


Figure 4 The pathological examination of the scleral tissue. Fibrous connective tissue hyperplasia presents in a cystic form, with chronic inflammatory cell infiltration. The scale bars indicate 50 μ m.

Discussion

Necrotizing scleritis is the most severe form of IS, posing a serious threat to vision.⁴ Necrotizing scleritis typically has an onset of several days to weeks and is characterized by severe ocular pain centered around the eye globe and radiating to the ear, scalp, forehead, and jaw.⁵ Pterygium surgery is the most common factor inciting the development of IS, though other causes include cataract surgery and trauma.⁶ This reported case occurred after non-traumatic cataract surgery. The IS lesion area was not damaged during cataract surgery, but scleral wounds at the trocar puncture site for vitrectomy is routine in this area, so there is a possible relationship between the IS lesion and the patient's previous vitrectomy. The etiology of IS is predominantly bacterial, with *P. aeruginosa* the most common organism responsible for the infection's onset.⁷ Ocular infection with *P. aeruginosa* often occurs in a compromised host,⁸ consistent with our patient's history of diabetes, hypertension, and vitrectomy. Treatment options for IS include topical and systemic antibiotic therapy, as well as surgical debridement.⁹

Infectious necrotizing scleritis must be actively treated after diagnosis, with early infection control offering the key to avoiding ocular damage and other serious complications. Since drug penetration in the sclera is very limited, 80% of patients with IS cannot simply be administered drugs to control the disease; instead, they require local debridement and multiple surgeries.⁵ Scleral transplantation and amniotic membrane transplantation are required in many patients due to severe scleral and conjunctival necrosis. Despite these surgical efforts, many cases of necrotizing scleritis cannot be controlled, necessitating enucleation of the eye to prevent orbital cellulitis. Instead, in the reported case, the patient's IS was effectively cleaned and rinsed with antibiotics during just one operation and every day thereafter during the patient's recovery. The conjunctiva and sclera wounds healed quickly, and the patient's vision improved.

In conclusion, severe eye pain inconsistent with intraocular infection after ocular surgery should raise suspicion of IS. Thorough debridement and antibiotic irrigation are the key measures to treat this disease.

Abbreviation

IS, infectious scleritis.

Data Sharing Statement

Data on the case clinical information and images are available for review from the corresponding author upon request.

Ethics Statement

This study was approved by the ethics committee of Shandong First Medical University of Qingdao Eye Hospital. Institutional approval for publication of anonymized clinical details was obtained from Shandong First Medical University of Qingdao Eye Hospital in accordance with local regulations and ethical guidelines. The patient provided informed consent for the publication of this case.

Consent

Written informed consent for publication was obtained from the patient and his family.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This study was supported by the Natural Science Foundation of Shandong Province (ZK2022MH277).

Disclosure

All authors declare no conflicts of interest in this work.

References

1. Moshirfar M, Ronquillo Y. *Infectious Scleritis*. Treasure Island: StatPearls Publishing; 2023.
2. Quezada-Osoria ML, Vera-Duarte GR, Pedroza-Seres M. Pseudomonas-induced scleritis mimicking autoimmune necrotizing scleritis. A case report. *Arch Soc Esp Oftalmol*. 2025;100(2):107–110. doi:10.1016/j.oftale.2024.12.008
3. Chinese Vitreo-Retina Society of Chinese Medical Association, Chinese Cataract and Refractive Surgery Society, China Ocular Trauma Society, Glaucoma Group of Ophthalmology Branch of Chinese Medical Association. Chinese expert consensus on the diagnosis and management of infectious endophthalmitis after ophthalmic surgery (2022). *Zhonghua Yan Ke Za Zhi*. 2022;58(07):487–499. doi:10.3760/cma.j.cn112142-20220301-00088
4. Okhravi N, Odufuwa B, McCluskey P, et al. *Scleritis*. *Surv Ophthalmol*. 2005;50(4):351–363. doi:10.1016/j.survophthal.2005.04.001
5. Watson PG, Hayreh SS. Scleritis and episcleritis. *Br J Ophthalmol*. 1976;60(3):163–191. doi:10.1136/bjo.60.3.163
6. Hodson KL, Galor A, Karp CL, et al. Epidemiology and visual outcomes in patients with infectious scleritis. *Cornea*. 2013;32(4):466–472. doi:10.1097/ICO.0b013e318259c952
7. Chen X, Lv X, Yang L, Bai F, Liu X. Etiology, pathogens, clinical features and treatment of bacterial scleritis. *Semin Ophthalmol*. 2023;38(6):521–528. doi:10.1080/08820538.2023.2177117
8. Burns RP. *Pseudomonas aeruginosa* Keratitis: mixed Infections of the Eye. *Am J Ophthalmol*. 1969;67(2):257. doi:10.1016/0002-9394(69)93156-0
9. Moussa K, Shantha J, Schallhorn JM. Blurry vision and eye pain after pterygium surgery. *JAMA Ophthalmol*. 2018;136(7):827–828. doi:10.1001/jamaophthalmol.2017.6054

Infection and Drug Resistance

Publish your work in this journal

Infection and Drug Resistance is an international, peer-reviewed open-access journal that focuses on the optimal treatment of infection (bacterial, fungal and viral) and the development and institution of preventive strategies to minimize the development and spread of resistance. The journal is specifically concerned with the epidemiology of antibiotic resistance and the mechanisms of resistance development and diffusion in both hospitals and the community. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/infection-and-drug-resistance-journal>

Dovepress
Taylor & Francis Group