

Combined Tenonplasty and Scleral Graft for Refractory *Pseudomonas* Scleritis Following Pterygium Removal with Mitomycin C Application

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Abstract

Purpose: To report a surgical approach combining scleral patch graft and tenonplasty for successful management of refractory *Pseudomonas* scleritis following pterygium removal with mitomycin C application.

Case Report: A 75-year-old diabetic woman with a history of prior pterygium excision and mitomycin C application developed infectious necrotizing scleritis caused by *Pseudomonas aeruginosa*. Owing to progression of scleritis despite medical management, the patient underwent surgery. Intraoperatively, extensive scleral ischemia was noted. Therefore, debridement of the necrotic tissue, scleral graft, tenonplasty to bring blood vessels to the ischemic sclera, and amniotic membrane transplantation were performed. Postoperatively, no signs of ischemia or recurrence of infection were observed. During 6 months of follow-up, the patient achieved complete restoration of the globe integrity with a non-inflamed ocular surface.

Conclusion: Through restoration of blood supply to the ischemic sclera, tenonplasty is an effective adjunctive procedure in addition to conventional scleral patch graft for the treatment of refractory *Pseudomonas* scleritis associated with ischemia.

Keywords: Infectious Scleritis; Mitomycin C; *Pseudomonas Aeruginosa*; Pterygium Excision; Tenonplasty

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INTRODUCTION

Infectious scleritis, which constitutes 5%–10% of scleritis cases, is a serious disease with devastating ocular complications.^[1] *Pseudomonas aeruginosa*, which is the most common causative microorganism,^[2] causes an aggressive necrotizing scleral infection. In affected patients, scleral ischemia caused by the underlying

infectious process aggravates the pathogenesis by minimizing the penetration of antibiotics.^[3,4] Scleral ischemia can also be a complication of mitomycin C (MMC) application at the time of pterygium surgery,^[5] which itself predisposes patients to the development of infectious scleritis.^[6]

For patients with infectious scleritis who are refractory to medical management with antibiotics, a surgical procedure is required. After surgical debridement of necrotic and infectious tissues, tectonic support in the form of corneal patch graft, scleral patch graft, or autologous fascia lata may be needed.^[7] However, poor surgical

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outcomes have been reported in *Pseudomonas* scleritis,^[8] possibly because the underlying scleral ischemia has not been addressed by the aforementioned procedures.

Herein, we describe the use of tenonplasty, which restores the blood supply to the ischemic sclera, combined with a scleral graft for management of refractory *Pseudomonas* necrotizing scleritis associated with scleral ischemia.

CASE REPORT

A 75-year-old diabetic woman presented to us with complaints of pain and redness in the left eye for 2 weeks. Past ocular history in the left eye included a bare sclera pterygium excision with adjunctive MMC application 4 years previously and a cataract extraction 4 months before presentation. At the time of presentation, the uncorrected visual acuity of the left eye was counting fingers at 50 cm. Examination revealed a 3 × 3 mm white patch of scleral necrosis and melting [Figure 1a]. A mild corneal edema and a moderately severe cellular reaction in the anterior chamber were also noted.

With a presumptive diagnosis of infectious necrotizing scleritis, smear and culture samples were taken for

microbiological studies. The patient was then treated with topical amikacin (25 mg/mL), ceftazidime (50 mg/mL), and ciprofloxacin (0.3%) eye drops every hour as well as intravenous ceftazidime (2 g every 8 h). The bacterial culture subsequently showed a significant growth of *P. aeruginosa*, which was sensitive to amikacin, ceftazidime, ciprofloxacin, and gentamicin, and resistant to cefazolin, trimethoprim, and vancomycin.

Despite intensive antibiotic treatment for 12 days, vision decreased to light perception, and progression of the scleral melting was observed [Figure 1b]; therefore, the patient underwent surgery. Intraoperatively, surgical debridement of the necrotic scleral tissue revealed extensive areas of ischemia [Figure 1c]. To manage this ischemia, the Tenon's capsule was extensively dissected from the surrounding conjunctiva and advanced anteriorly [Figure 1d]. After scleral graft for tectonic support of the thinned sclera [Figure 1e], tenonplasty was performed by suturing the pedunculated flaps of the Tenon's capsule over the scleral graft, using 6-0 vicryl sutures [Figure 1f]. Finally, amniotic membrane transplantation was performed to cover the scleral graft and the overlying Tenon tissue [Figure 1g].

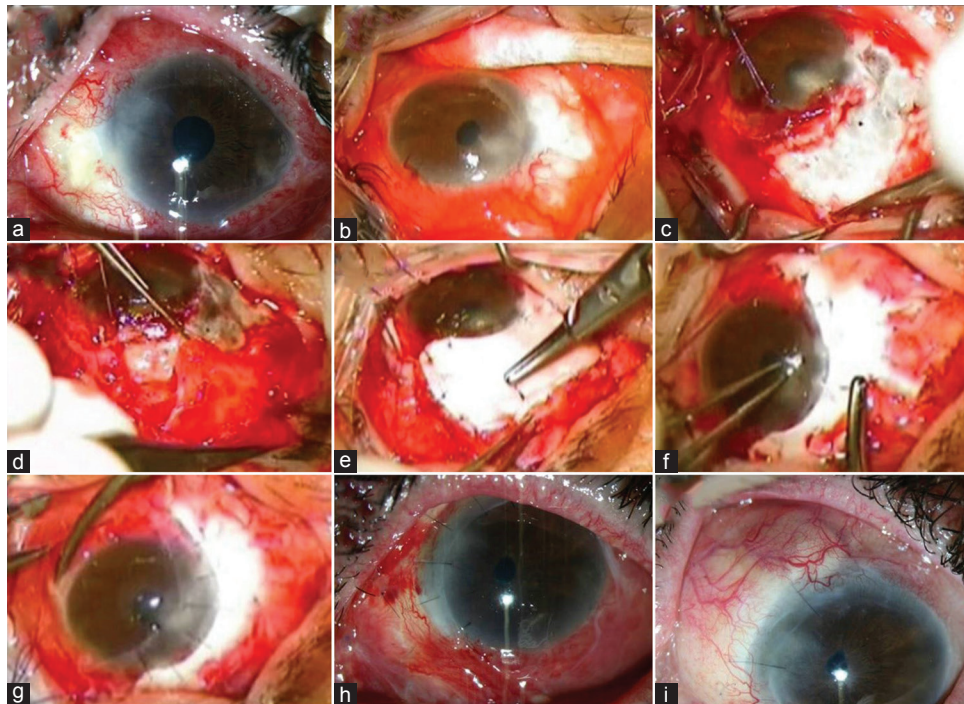


Figure 1. Combined scleral grafting and tenonplasty for refractory *Pseudomonas* necrotizing scleritis associated with ischemia. At the time of presentation, the patient had a white patch of scleral necrosis and melting caused by infectious scleritis (slit lamp photo, a) which progressed despite antibiotic therapy (surgical view, b). During surgery, debridement of the necrotic scleral tissue was first performed, which unraveled extensive areas of underlying ischemia (c). The Tenon's capsule was extensively dissected from the surrounding conjunctiva (d). Then, after scleral grafting for tectonic support (e). Pedunculated flaps of the Tenon's capsule were sutured over the scleral graft (f). Amniotic membrane was then used to cover the scleral-Tenon graft (g). One week after surgery (h), the inflammatory process started to show improvement and there was a re-epithelialization of the graft. During 6 months of follow-up, structural integrity of the globe and ocular surface was restored with no recurrence of infection (i).

The postoperative course was uneventful, with a gradual decrease in ocular inflammation as well as conjunctival re-epithelialization over the graft. Evaluations during 6 months of follow-up revealed an intact scleral graft, complete maintenance of the structural integrity of the globe and ocular surface, and no recurrence of infection [Figure 1h and i]. No complication was noted except for the formation of posterior iris synechia onto the posterior chamber intraocular lens.

DISCUSSION

This case report showed that in a patient with *Pseudomonas* necrotizing scleritis refractory to medical therapy, which was also associated with ischemia, an approach combining surgical debridement, scleral grafting, tenonplasty, and amniotic membrane transplantation was an effective procedure to restore the ocular integrity while mitigating the underlying ischemia, which contributes to the pathogenesis of the disease. In our patient, conjunctival and episcleral vessels were destroyed because of trauma during pterygium excision and cataract surgery;^[9] furthermore, MMC application during pterygium surgery probably initiated the scleral ischemia, predisposing to infection. Additionally, subsequent inflammatory microangiopathy in response to the *Pseudomonas* infection further depleted the blood supply [Figure 1b and c], resulting in resistance to medical therapy.^[7]

To manage ischemia in our case, tenonplasty was performed to bring vascular supply to the sclera. Tenonplasty, which was first described by Teping and Reim,^[10] includes advancement of the vascular Tenon's capsule from other parts of the eye to the ischemic sclera. This procedure has been successfully used to treat scleral ischemia in various conditions, such as severe chemical burns as well as pterygium excision with adjunctive beta irradiation or MMC application.^[11-13]

In our case of refractory *Pseudomonas* scleritis with associated ischemia, the patient maintained structural and functional integrity of the globe with no recurrence of infection for 6 months after scleral grafting and tenonplasty. This contrasts with other studies without tenonplasty, which have reported variable outcomes, including recurrence of infection or a need for subsequent evisceration or enucleation.^[2,7] Therefore, adjunctive tenonplasty might have helped improve the outcome in our patient by ensuring restoration of the blood supply.

Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of Interest

There are no conflicts of interest.

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