A devastating infectious sclerokeratitis after pterygium surgery: A case report

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SUMMARY

Pterygium excision is a common procedure with generally good outcomes, but infectious complications, although rare, can lead to severe visual impairment if not promptly managed. We report a case of a 71-year-old man who developed bacterial keratitis with dense stromal infiltrate, central corneal melt, and hypopyon following left eye pterygium excision with conjunctival autograft. Corneal scraping yielded Streptococcus pneumoniae. Despite aggressive treatment with antibiotics and antifungals, the condition worsened, requiring a large-diameter penetrating keratoplasty due to progressive corneal thinning and extension to the adjacent sclera. This case underscores the rare but serious risk of infectious sclerokeratitis after pterygium surgery, highlighting the importance of early diagnosis and prompt antimicrobial therapy. It also emphasises the need for careful preoperative assessment, meticulous intraoperative measures, and diligent post-operative follow-up if a good visual outcome is to be attained.

INTRODUCTION

Pterygium is a degenerative benign ocular surface disorder with a wing-shaped fibrovascular conjunctival growth that encroaches onto the cornea over time.[1] Symptoms of pterygium include foreign body sensation, persistent eye redness, and lacrimation. In advanced cases, it may cause visual disturbance due to astigmatism and obscuration of the optical axis by pterygium tissue.[1] The current gold standard treatment for clinically significant pterygium is excision with conjunctival autograft, demonstrating a low recurrence rate.[2] Although generally effective, this procedure is not without risks. We report a severe case of bacterial keratitis following pterygium excision with conjunctival autograft, which progressed to sclerokeratitis necessitating a large-diameter penetrating keratoplasty (PK).

CASE PRESENTATION

A 71-year-old man with no known comorbidities presented with left eye pain, redness, and reduced vision ten days after an uneventful pterygium excision with conjunctival autograft. No intraoperative adjuvants were used. Post-operatively, the patient was prescribed topical chloramphenicol 0.5% every four hours and dexamethasone 0.1% every two hours, in accordance with our centre's routine post-pterygium surgery protocol to control inflammation and reduce recurrence risk. The patient was compliant with the prescribed regimen; however, the medications ran out three days prior to presentation. There was no ocular trauma or foreign body exposure following the surgery.

His best corrected visual acuity (BCVA) was 6/18 in the right eye and counting fingers (CF) in the left eye. Initial examination of the left eye showed mildly swollen eyelids with meibomian gland capping. The conjunctiva was diffusely injected and chemotic, with a large corneal epithelial defect measuring 8 mm x 8 mm, dense stromal infiltrate, and central corneal melt, along with a 1.2 mm hypopyon obscuring the view of the fundus. B-scan ultrasonography revealed no evidence of loculation in the left eye. Anterior and posterior segment examinations of the right eye were otherwise unremarkable. His blood sugar profile was normal, and no further investigations for other immunosuppressive conditions were conducted.

Given the patient's presentation, a mixed infection was suspected, so he was started empirically with hourly topical Gentamicin 0.9%, Ceftazidime 0.5%, Amphotericin B 0.15%, and Fluconazole 0.2%, along with oral Doxycycline 100 mg once a day and Vitamin C 1 g/day. Corneal scraping was done prior to initiation of antimicrobial treatment. The Gram stain returned as no detectable organism; however, culture and sensitivity yielded Streptococcus pneumoniae from the cultured sample. Topical Ceftazidime was subsequently changed to topical Vancomycin based on the culture and sensitivity, which came back after five days of empirical antimicrobial therapy. Despite treatment, the left eye condition progressively worsened to total corneal ulcer, with an increasing hypopyon level, scleral abscess formation (Fig. 1), the development of peripheral anterior synechiae, and a subsequent rise in the intraocular pressure (IOP) requiring three types of IOP-lowering agents.

After 12 days of unsuccessful treatment, the patient was subjected to left penetrating keratoplasty (PK). The surgery was done on day 23 after his pterygium excision. Corneal tissue obtained from the surgery was sent for Gram stain, culture, and sensitivity. During post-PK review day 1, left eye conjunctival chemosis and injection reduced. The cornea appeared mildly hazy with a central epithelial defect (Fig. 2). Posterior synechiae were noted from 3 to 5 o'clock, and a cataractous lens was noted. No organism was isolated from

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Table I: Summary of post-pterygium sclerokeratitis cases reported over the last decade

Author, Year	Case	Technique	Latency period (after pterygium surgery)	Pathogen	Treatment
Fidelix et al., 2016[10]	51/Female **ANA positive	Bare sclera	2-3 months	No growth of organism	• Oral steroid • Immunosuppressive (Azathioprine, Cyclophosphamide) • Rituximab
Soleimani et al., 2019[4]	56/Female DM	AMT	27 days	Streptococcus Pseudomonas	• Topical antibiotics (Ceftazidime, Vancomycin) • Scleral patch graft and PKP
	62/Male No comorbidities	Conjunctival graft	32 days	No growth	• Topical antibiotics (Cefazolin, organism Amikacin) • AMT
	60/Male No comorbidities	AMT	35 days	Streptococcus	• Topical antibiotics (Cefazolin, Amikacin) • PKP
	62/Female No comorbidities	Conjunctival graft	32 days	Fusarium	• Topical antifungal (voriconazole) • PKP
Teoh et al., 2023[8]	75/Male No comorbidities	-	10 days	Pseudomonas aeruginosa	• Topical antibiotic (Gentamicin, Ceftazidime) • Topical NSAID • Systemic antibiotic (Ciprofloxacin)
Lee et al., 2007[9]	72/Female No comorbidities	-	6 months	MRSA	• Topical antibiotics (Ciprofloxacin, Vancomycin) • Systemic antibiotics (Amikacin, Ceftazidime) • Scleral patch graft and sliding conjunctival flap

ANA, anti-nuclear antibody; DM, diabetes mellitus; AMT, amniotic membrane transplantation; MRSA, Methicillin-resistant Staphylococcus aureus; PKP, penetrating keratoplasty; NSAID, non-steroidal anti-inflammatory drug

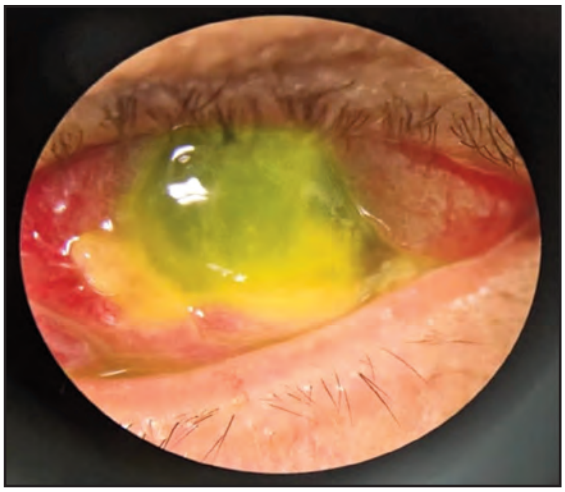

Fig. 1: Slit lamp examination of the left eye showed a total corneal ulcer with corneal melt and scleral abscess, along with diffuse conjunctival injection and chemosis.

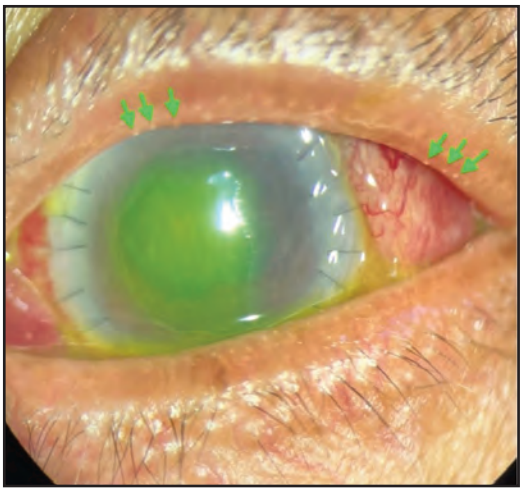

Fig. 2: Day-1 post-right penetrating keratoplasty showing reduced conjunctival injection and chemosis. The cornea is mildly hazy, with a central epithelial defect. The green arrows highlight clogged meibomian glands, suggestive of pre-existing meibomitis.

the sample. Topical antibiotics were maintained and tapered off gradually, while topical antifungal agents were discontinued early as there was no evidence of fungal growth. At his most recent follow-up, six months post-PK, his vision was hand movements with persistent left corneal button oedema. He was then counselled for a second left eye PK, but he was still undecided.

DISCUSSION

Pterygium excision with conjunctival autograft is a commonly performed procedure that remains the preferred technique to reduce the recurrence of pterygium.[1,2] Other reported complications include scleral ulceration, necrotising scleritis, perforation, iridocyclitis, cataract, and glaucoma.[3-5] Although rare, infectious scleritis and infectious keratitis,

collectively known as sclerokeratitis, are serious potential post-surgery complications.[3-5] The major risks for infectious sclerokeratitis include excessive intraoperative scraping, cauterisation, and adjunctive treatment with beta-irradiation and mitomycin C (MMC).[4] Additionally, a persistent corneal epithelial defect, chronic avascular zones at the pterygium site, and steroid-induced scleral ischemia also predispose to infection by the ocular surface flora.[4]

The development of infectious sclerokeratitis in our patient was likely multifactorial, with meibomitis (Fig. 2) as a pre-existing ocular surface disease and advanced age being a key contributor.[6,7] Older patients are more prone to tear film instability, dry eye, and age-related immune decline, all of which increase their susceptibility to infection.[6,7] Although no adjuvants were used, the intensive use of strong topical steroids post-operatively in our patient likely impaired immune defence and delayed corneal epithelial healing. This contributed to elevated proteolytic enzyme activity and corneal thinning, further compromising ocular integrity, particularly in the presence of meibomitis, which led to poor recovery and worsening of the infection. Similar post-pterygium sclerokeratitis cases published over the past decade are summarised in Table I.

A multifaceted approach is essential to prevent infective sclerokeratitis following pterygium excision. Pre-operative assessment should address any ocular surface diseases (OSD) such as dry eye, blepharitis, and meibomitis, which increase the risk of post-operative infection.[6] Intraoperatively, meticulous techniques, including complete pterygium tissue excision, appropriately sized conjunctival autograft with minimal tenons, and full coverage of the bare sclera, are paramount to minimise epithelial defects and complications.[5] Post-operative care should include the prompt commencement of broad-spectrum antibiotics and careful use of topical steroids, particularly in elderly patients, to prevent delayed healing and secondary infections.[7] Adjunctive amniotic membrane transplantation (AMT) provide anti-inflammatory and wound-healing benefits, potentially enhancing corneal recovery.[1] Alternatively, non-steroidal anti-inflammatory drugs (NSAIDs) may help control inflammation without the risks associated with steroids.[1]

Currently, there are no established guidelines or standardised risk stratification tools for managing infectious sclerokeratitis following pterygium surgery. Treating infectious keratitis itself is challenging, given the variability in individual immune responses. Clinical judgement remains essential, and clear communication between the consultant and the patient is critical, particularly in cases that are refractory to medical therapy. Urgent PK may be required to reduce the microbial load by removing the infected tissue, thereby helping to control the infection and potentially shorten the recovery period.[3,4] In this case, a large-diameter PK was preferred, as it ensured the complete removal of infected and necrotic tissue, preventing posterior scleral extension and eliminating the need for evisceration. A comprehensive perioperative approach and regular follow-up remain essential for early detection of infection, delayed epithelial defects, or severe inflammation following pterygium surgery.

CONCLUSION

Infectious sclerokeratitis is a rare but sight-threatening complication following pterygium surgery. Preventive measures, including thorough preoperative assessment to identify OSD or MGD, meticulous surgical techniques, and the judicious use of postoperative corticosteroids, are crucial in minimising the risk of infection and associated complications. Early recognition and prompt, targeted intervention remain essential to preserving visual outcomes in affected patients.

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DECLARATIONS

Consent was obtained from the patient prior to publication. There is no conflict of interest related to this study. This study was made without any financial support. This manuscript has been read and approved by the named authors.

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