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CASE REPORT

Refractory Bilateral Contact Lens–associated Fungal Keratitis Managed with Intrastromal and Intracameral Therapy: A Case Report

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ABSTRACT

Case presentation: We report a rare case of bilateral contact lens–associated infectious keratitis in an 18-year-old female who presented with pain, redness, photophobia, discharge, and profound visual loss in both eyes. Prior to presentation, she had been treated with topical steroid-containing eye drops, following which her symptoms worsened significantly. Ocular examination revealed bilateral corneal stromal infiltrates with epithelial defects, endothelial plaques, recurrent hypopyon, and elevated intraocular pressure. Despite aggressive medical management, including topical and systemic antimicrobial therapy, repeated anterior chamber washouts, and intrastromal and intracameral antibiotic and antifungal injections, the disease demonstrated a refractory course. Progressive corneal thinning led to bilateral descemetocele formation, necessitating bilateral amniotic membrane transplantation with tarsorrhaphy. After stabilization, therapeutic keratoplasty was ultimately required in the left eye. This case highlights the potential for rapid bilateral progression of contact lens–associated keratitis, the adverse impact of prior corticosteroid use, and the need for early recognition, prompt escalation of therapy, and timely surgical intervention in severe cases to preserve ocular integrity and optimize visual outcomes.

Keywords: Keratitis, Contact Lenses, Steroids, Antifungal Agents.

INTRODUCTION

Microbial keratitis is a potentially vision-threatening ocular emergency and remains a leading cause of corneal blindness worldwide[1]. It predominantly affects young and economically productive individuals and is associated with significant visual morbidity if not diagnosed and managed promptly. The condition may be caused by a wide range of pathogens, including bacteria, fungi, and protozoa, with clinical severity ranging from superficial corneal infiltrates to deep stromal involvement, hypopyon formation, and corneal perforation[2].

Contact lens wear is one of the most important predisposing factors for microbial keratitis and has become increasingly prevalent with the widespread use of soft contact lenses[3]. Contact lens–associated keratitis is most commonly unilateral and is frequently linked to improper lens hygiene, intermittent or extended wear, and exposure to contaminated water[4]. Bacterial pathogens, particularly Pseudomonas aeruginosa, are most commonly implicated; however, fungal and mixed infections are increasingly recognized, especially in severe or atypical presentations[5].

The use of topical corticosteroids in undiagnosed infectious keratitis is a well-documented risk factor for disease progression and poor outcomes[6]. Corticosteroids may suppress local immune responses, mask early clinical signs, and facilitate deeper microbial invasion, particularly in fungal keratitis[7]. Several studies have reported increased rates of corneal thinning, delayed healing, and higher need for surgical intervention in patients who receive topical steroids prior to establishing an accurate diagnosis[8,9].

Severe microbial keratitis poses significant therapeutic challenges. In advanced cases, medical therapy alone may be insufficient, and complications such as recurrent hypopyon, stromal melting, descemetocele formation, and corneal perforation may occur[10]. Adjunctive interventions, including intrastromal[11] and intracameral antimicrobial injections[12], anterior chamber washout, amniotic membrane transplantation[13], and therapeutic keratoplasty[14], are often required to control infection and preserve globe integrity. However, evidence guiding the optimal timing and combination of these interventions remains limited.

We report a rare and severe case of bilateral contact lens–associated infectious keratitis in an 18-year-old female with prior topical steroid exposure, complicated by recurrent hypopyon and progressive corneal thinning, ultimately requiring multiple anterior chamber washouts, bilateral amniotic membrane transplantation, and therapeutic keratoplasty. This case highlights the diagnostic and management challenges of severe keratitis and underscores the importance of early recognition, appropriate antimicrobial therapy, and timely surgical intervention.

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CASE PRESENTATION

An 18-year-old female presented to the ophthalmology outpatient department with complaints of pain, redness, photophobia, discharge, and progressive decrease in visual acuity in both eyes for 15 days. She had a history of myopia for six years (−3.5 DS in the right eye and −4.0 DS in the left eye), for which she primarily used spectacles. She reported intermittent use of soft contact lenses, with the last use occurring for two days approximately 25 days prior to presentation. Before presenting to our tertiary care center, the patient had been treated at an outside facility with topical Tobramycin–dexamethasone combination, Mexidex®, and atropine 1%. Despite this treatment, her ocular pain worsened and visual acuity further deteriorated. There was no history of ocular trauma, surgery, or prior prolonged steroid use.

On examination, the best-corrected visual acuity was hand movements in both eyes. Slit-lamp examination of the right eye revealed lid edema, marked conjunctival and ciliary congestion, and diffuse corneal edema. A 6 × 6 mm ring-shaped gray stromal infiltrate with overlying epithelial defect was noted, along with endothelial precipitates beneath the infiltrate and a hypopyon measuring approximately 1.5 mm. Intraocular pressure was digitally elevated, and details of the anterior chamber were not clearly visible (Figure 1). Examination of the left eye showed lid edema with conjunctival and ciliary congestion. A central corneal opacity measuring 5 × 6 mm with epithelial defect and endothelial plaques was present, along with a 1.5-mm hypopyon. Intraocular pressure was also digitally high, and anterior segment details were obscured.

Given the severity of presentation, anterior chamber wash was performed on the first visit for hypopyon drainage, followed by intrastromal and intracameral injections of cefuroxime (1 mg/0.1 mL) and fluconazole (50 µg). The patient was admitted and started on intravenous ceftriaxone (1 g twice daily) and intravenous dexamethasone (8 mg once daily). Topical therapy included moxifloxacin four times daily, fluconazole eye drops every two hours, atropine twice daily, lubricants four times daily, and intraocular pressure–lowering agents (dorzolamide 2% with timolol 0.5% twice daily).

Two days later, the patient developed recurrent hypopyon in both eyes (Figure 2). A second anterior chamber wash was performed, along with corneal scraping and repeat intrastromal and intracameral injections of cefuroxime and fluconazole at the same dosages. Oral itraconazole 100 mg twice daily was added to the treatment regimen. Subsequently, the left eye showed symptomatic and clinical improvement, while the right eye demonstrated persistent inflammation with repeated hypopyon formation. Over the next two weeks, three additional anterior chamber washes with repeat intrastromal and intracameral antibiotic and antifungal injections were performed in the right eye due to lack of response.

On follow-up, the left eye was quiet with residual central corneal opacity, whereas the right eye continued to show circumcorneal congestion, stromal infiltrates, and endothelial plaques (Figure 3). The same systemic and topical therapy was continued. One week later, the patient presented with severe pain in the left eye. On examination, bilateral descemetocele formation was noted. Bilateral amniotic membrane transplantation with tarsorrhaphy was performed (Figure 4). During close follow-up over three months, the left eye stabilized, following which therapeutic keratoplasty was performed (Figure 5).

Figure 1: Showing hypopyon of 1.5mm with unclear anterior segment details.

Figure 2: Showing hypopyon in both eyes and surrounding conjuctival redness (due to injection).

Figure 3: Left eye showing central corneal opacity and right eye showing circumcorneal congestion and stromal infiltrates with endothelial plaques.

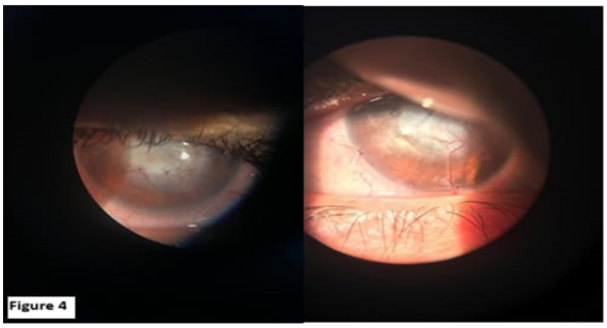

Figure 4: Showing bilateral corneal opacity with vascularization.

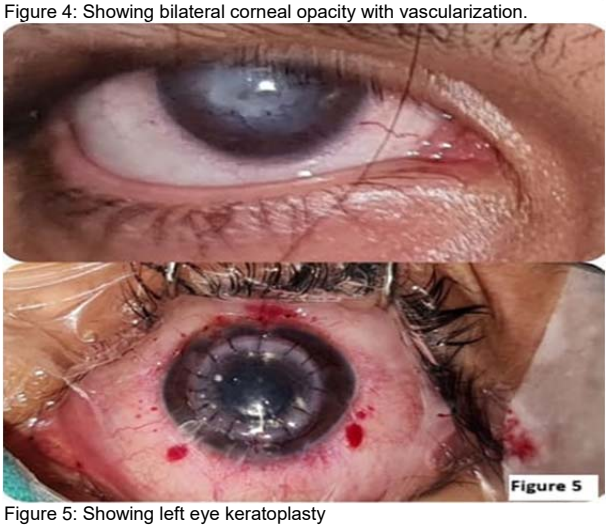

Figure 5: Showing left eye keratoplasty

DISCUSSION

Severe infectious keratitis remains a challenging clinical entity, particularly when complicated by bilateral involvement, delayed presentation, and prior corticosteroid exposure. While contact lens–associated keratitis is well recognized, most reported cases are unilateral and respond to early intensive topical therapy[15]. Bilateral, rapidly progressive disease requiring repeated anterior chamber interventions and multiple surgical procedures, as observed in the present case, is rarely reported and represents an extreme end of the disease spectrum.

A limited number of published case reports and small case series have described bilateral infectious keratitis associated with contact lens use**,** often linked to poor lens hygiene, exposure to contaminated water, or inappropriate initial therapy[16]. These reports consistently note a more aggressive clinical course, higher rates of corneal thinning, and increased need for surgical intervention compared with unilateral disease[17]. Similar to our patient, several published cases describe delayed referral and initial treatment with topical corticosteroids, which has been identified as a key modifiable risk factor for poor outcomes[18].

Current clinical guidelines for the management of microbial keratitis emphasize early corneal scraping for microbiological evaluation**,** prompt initiation of intensive topical antimicrobial therapy, and avoidance of corticosteroids until infection is adequately controlled[19]. In suspected fungal keratitis, guidelines recommend early initiation of topical antifungal agents and caution against empiric steroid use due to the risk of disease progression[20]. In the present case, prior exposure to steroid-containing eye drops likely contributed to diagnostic delay, deeper stromal involvement, and a refractory inflammatory response.

Management of advanced keratitis with hypopyon and endothelial involvement is not clearly standardized, and evidence is largely derived from observational studies and case reports. Adjunctive therapies such as intrastromal and intracameral

antimicrobial injections have been described for deep or non-responding infections, particularly fungal keratitis, with variable success[21]. Published series suggest that repeated administrations may be necessary in severe cases, reflecting the difficulty in achieving adequate drug concentrations within the corneal stroma and anterior chamber[22]. The repeated need for anterior chamber washouts in our patient further illustrates the intensity of intraocular inflammation and microbial burden associated with advanced disease.

Progression to descemetocele represents a critical turning point in infectious keratitis. Clinical guidelines and published experience support amniotic membrane transplantation as an effective temporizing strategy to stabilize corneal thinning, reduce inflammation, and preserve globe integrity[23]. In previously reported cases, AMT has been shown to delay or, in some instances, obviate the need for emergency keratoplasty[24]. In our patient, bilateral AMT allowed temporary structural stabilization; however, therapeutic keratoplasty was ultimately required due to irreversible stromal damage.

Therapeutic keratoplasty remains the definitive option for eyes with medically unresponsive infection or advanced structural compromise[25]. Consistent with published outcomes, the need for keratoplasty in this case reflects the severity of infection and the limitations of medical therapy alone in advanced bilateral disease, particularly when fungal or mixed infection is suspected.

This case adds to the existing literature by highlighting the potential for rapid bilateral progression of contact lens–associated keratitis**,** the detrimental impact of early corticosteroid use, and the role of a stepwise escalation from medical therapy to advanced surgical interventions. It reinforces the importance of guideline-based management, early referral, and individualized treatment strategies in preventing catastrophic visual outcomes.

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