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Case Report

Paecilomyces lilacinus-induced Scleritis Following Bleb-associated Endophthalmitis after Trabeculectomy

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Paecilomyces lilacinus (P. lilacinus) **is a rare cause of fungal scleritis. We herein report a case of *P. lilacinus*-induced scleritis following bleb-associated endophthalmitis after trabeculectomy that was successfully treated with surgical excision of the affected sclera in combination with antifungal medication. An 85-year-old female underwent trabeculectomy of the left eye. A dellen formed in the corneal periphery due to limbal elevation of the filtering bleb and progressed to an infectious corneal ulcer, leading to blebitis. Eight days after the onset of blebitis, the patient was diagnosed with endophthalmitis, which resolved after vitrectomy. The growth of *P. lilacinus* was identified on swabs of the conjunctiva and the corneal specimen. Scleritis developed after the resolution of the endophthalmitis, and an early excision of the affected sclera, in addition to antifungal medication, resolved it completely. However, the scleritis recurred in a different region of the left eye. After 7 months of antifungal medication, the left eye showed no residual infection. When treating *P. lilacinus*-induced scleritis, surgical excision of the affected sclera has been shown to be an effective treatment strategy. Nevertheless, it is possible that the infection may recur in another part of the eyeball after the complete resolution of the primary lesion.**

Key words: *Paecilomyces lilacinus*, scleritis, trabeculectomy

Paecilomyces lilacinus (P. lilacinus) has been reported to induce ocular infections in immunocompromised hosts [1-4] and after ocular trauma [5, 6] or intraocular lens implantation [7-10] and is a rare cause of fungal scleritis [6, 11, 12]. The visual outcomes of *P. lilacinus* infection are generally poor, despite the use of antifungal medication and surgical intervention [6, 11, 12]. We herein report a case of *P. lilacinus*-induced scleritis following bleb-associated endophthalmitis after mitomycin C trabeculectomy that was successfully treated with surgical excision of the affected sclera in combination with antifungal medication.

Case Report

An 85-year-old female, who had a 13-year history of primary open-angle glaucoma in both eyes and had been treated with several different types of eye drops, was referred to our hospital for further consultation. She had been treated for hypertension, hypercholes-

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terolemia, angina pectoris, and nontuberculous mycobacterium infection for 5 years. Her hobby was gardening.

She underwent trabeculectomy with mitomycin C of the left eye for advanced glaucoma. Two months postoperatively, a dellen, which is defined as a saucer-shaped excavation at the periphery of the cornea, formed due to limbal elevation of the filtering bleb (Fig. 1). The corrected decimal visual acuity was 0.3, and the intraocular pressure (IOP) was 11 mmHg in the left eye. The dellen persisted despite the discontinuation of dexamethasone eye drops and administration of medical treatment, including hyaluronate sodium eye drops 6 times per day and ofloxacin (0.3%) ointment at bedtime.

Ten months after the surgery, the dellen progressed into an infectious corneal ulcer, leading to blebitis (Table 1, Fig. 2). There were 3+ cells, 2+ flares and a fair amount of fibrin in the anterior chamber. A fluorescein examination showed that there was no leakage of aqueous humor from the bleb (Seidel negative). Surgical excision of the infected bleb and conjunctival advancement were performed in combination with the use of systemic and topical antibiotic therapy with topical cefmenoxime (0.5%) every 2 h, topical gatifloxacin (0.3%) every 2 h, and the intravenous instillation of meropenem (0.5 g) twice daily. After the infected bleb was excised using spring scissors, the scleral flap was closed with 10–0 nylon sutures. The bare sclera was then irrigated with ofloxacin (0.5%) and covered with the surrounding conjunctiva. Despite the excision of the infected bleb, the anterior segment inflammation did not improve and thereafter spread into the vitreous body. The patient was diagnosed with bleb-associated endophthalmitis 8 days after the onset of blebitis. The intraocular inflammation resolved after she underwent pars plana vitrectomy with the intraocular perfusion of vancomycin (20μg/mL) and ceftazidime (40μg/mL). The growth of *P. lilacinus* was identified on swabs of the conjunctiva and the corneal specimen of the left eye one month after onset.

Even though the bleb-associated endophthalmitis had resolved, the conjunctiva in the superotemporal part of the patient's left eye remained hyperemic. Three months after the resolution of the endophthalmitis, scleritis involving subconjunctival abscesses and corneal infiltrates developed (Fig. 3A, B). Due to the fact that *P. lilacinus* had been detected on the conjunctival swabs and the corneal specimen of the left eye, *P. lilacinus*-induced scleritis was suspected. Surgical debridement of the infected sclera was performed as follows. After the conjunctival dissection, the necrotic sclera was vigorously debrided with spring scissors until the underlying uveal tissue was barely visible. The debrided sclera was then irrigated with fluconazole (0.2%). Since we failed to cover the debrided area fully with the surrounding conjunctiva, most of it was left exposed. On the same day, antifungal medication with pimaricin (1%) ointment four times daily, topical fluconazole (0.2%) hourly and oral itraconazole (100 mg) once per day was started in addition to a two-week course of subconjunctival injections of fluconazole (5 mg) twice per day. The scleral

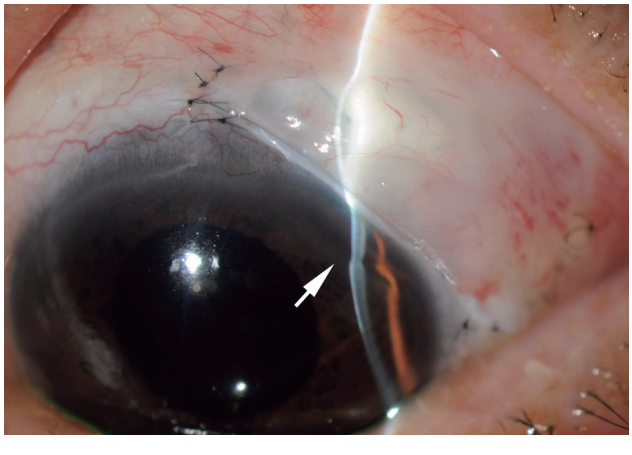


Fig. 1 A dellen (white arrow) formed in the corneal periphery due to limbal elevation of the filtering bleb 2 months postoperatively.

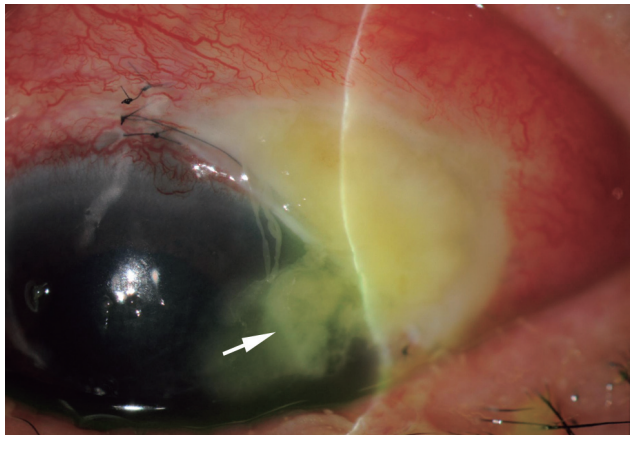
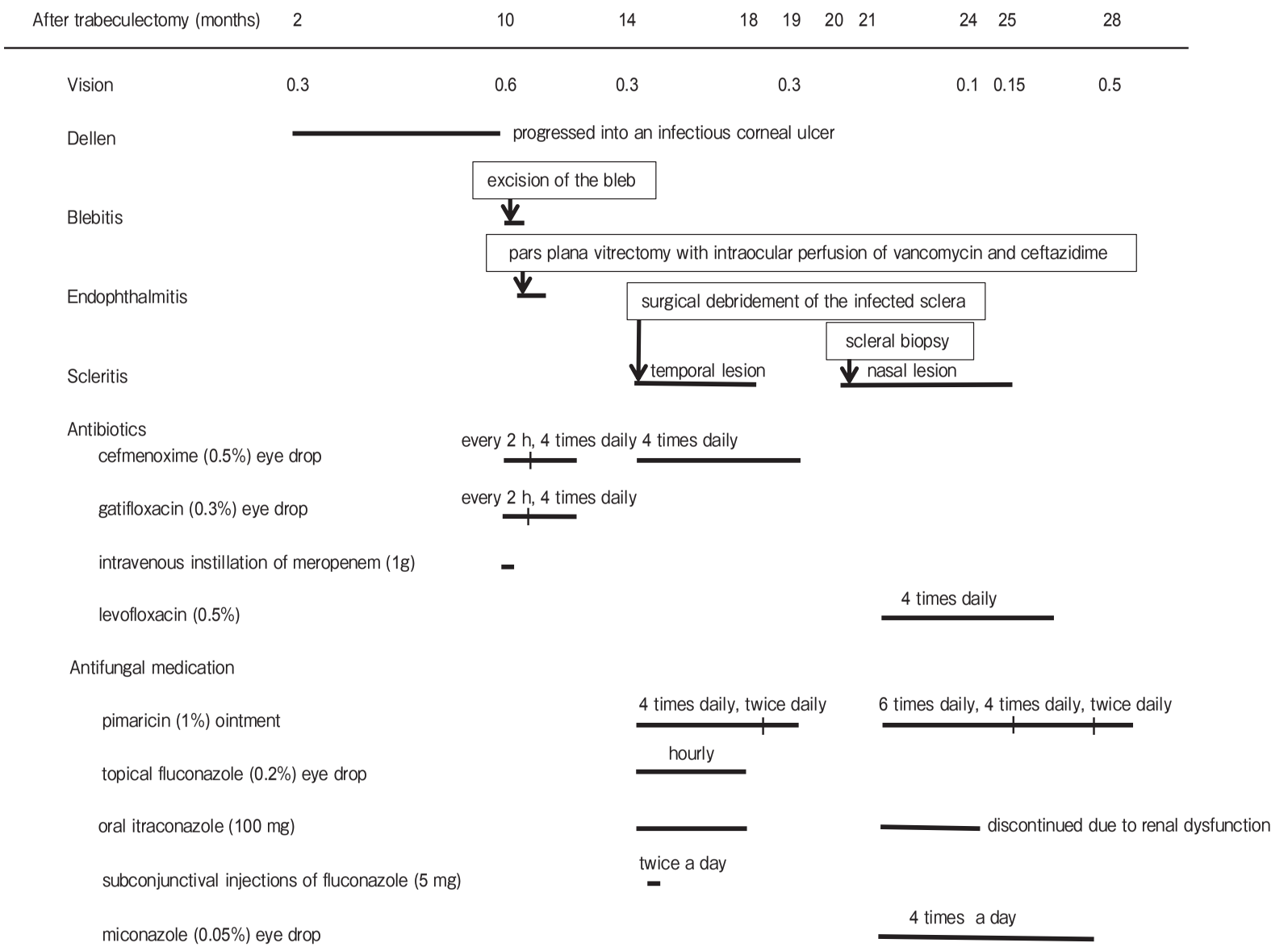


Fig. 2 The dellen progressed into an infectious corneal ulcer (white arrow), leading to blebitis 10 months after trabeculectomy.

Table 1 Progress after trabeculectomy



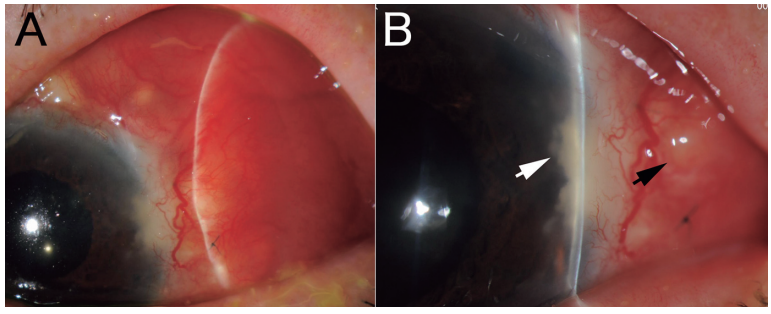


Fig. 3 A, Scleritis involving subconjunctival abscesses and corneal infiltrates developed 3 months after the resolution of bleb-associated endophthalmitis; B, a magnified view showing subconjunctival abscesses (black arrow) and corneal infiltrates (white arrow).

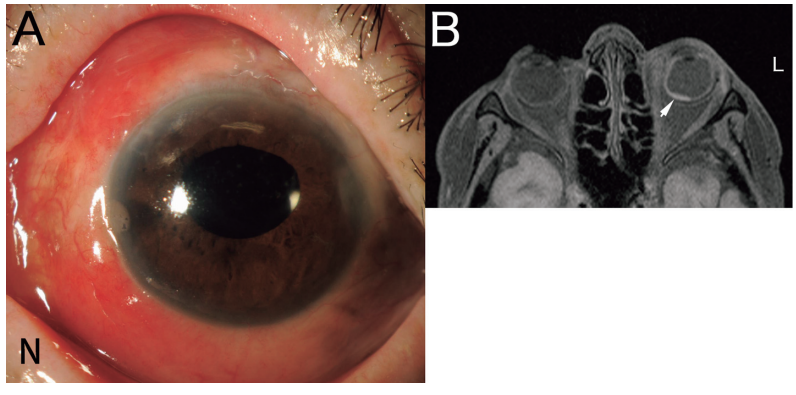


Fig. 4 A, Scleritis recurred in the nasal region (N) 6 months after the resolution of the scleritis in the temporal region. The choroid could be seen through the sclera in the temporal region due to scleral thinning; B, a T2-weighted MR image showed thickening and high intensity in the nasal part of the wall of the left eye (white arrow), indicating a recurrence of scleritis in a different region from the primary lesion. The partial defect of the right eyelid is an artifact.

inflammation in the superotemporal part of the left eye began to subside, resolving completely 4 months following excision of the affected sclera.

One month after the complete resolution of the primary lesion, the antifungal medication was discontinued. A few weeks after the discontinuation of the antifungal medication, however, the conjunctiva was found to be swollen in the nasal portion of the left eye (Fig. 4A). A T2-weighted magnetic resonance imaging (MRI) showed thickening and high intensity in the nasal part of the wall of the left eye (Fig. 4B), which indicated a recurrence of the scleritis in a different region from the primary lesion. A scleral biopsy was carried out, and the culture showed the growth of *P. lilacinus*. Surgical excision of the recurrent lesion was not performed since it seemed to be less severe, without any visible subconjunctival abscesses. Treatment with topical miconazole (0.05%) 4 times a

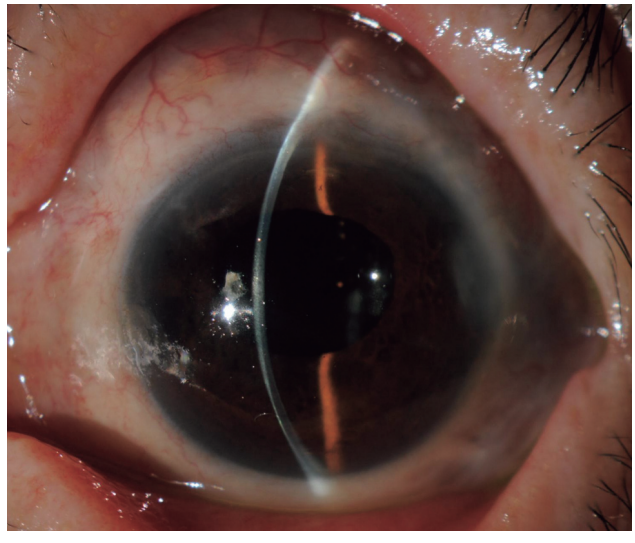


Fig. 5 Residual infection was absent at the last visit.

day was started in addition to pimaricin (1%) ointment 6 times daily and oral itraconazole (100 mg) once per day.

Although the oral itraconazole was discontinued due to the onset of renal dysfunction 3 months later, the patient's left eye showed no residual infection after 7 months of antifungal medication for the recurrence of scleritis (Fig. 5). Her corrected visual acuity recovered to 0.5, with an IOP of 9 mmHg in her left eye. No fungal infections have recurred to date.

Discussion

P. lilacinus, a saprophytic filamentous fungus, can be found in the soil and decomposing vegetation and is also a common laboratory contaminant [8]. The poor visual outcomes of ocular infection caused by *P. lilacinus* are largely associated with the virulence of the pathogen, which is comparable to that of Fusarium and Aspergillus, and its superior ability to develop resistance to multiple conventional antifungal drugs [5, 13, 14]. To our knowledge, 3 cases of *P. lilacinus*-induced scleritis have been reported after ocular trauma [6], intraocular lens implantation [11] and initial noninfectious scleritis [12], all of which involved a poor prognosis for visual acuity. This is the first report of *P. lilacinus*-induced scleritis following trabeculectomy with mitomycin C that was successfully treated with early surgical excision of the affected sclera in combination with antifungal medication.

The use of antiproliferative agents, such as mitomycin C at the time of trabeculectomy has been reported to contribute to the formation of thin, avascular filtering blebs and to lead to an increase in bleb-related infections [15]. Moreover, the presence of an epithelial defect and prolonged use of corticosteroids are the most common risk factors for fungal infection [1]. In the present case, the dellen, which developed due to limbal elevation of the thin, avascular filtering bleb, was the original lesion of the fungal infection. Dellen formation may occur in corneas with filtering blebs presumably as a result of localized disruption of the precorneal tear film [16]. Most patients with a dellen have an intact corneal epithelium; however, severe cases may involve de-epithelialization or erosion of the underlying stroma [16]. Therefore, for cases in which dellens are persistent despite medical treatment or in which signs of de-epithelialization are noted, surgical intervention, such as remodeling of filtering blebs, should be considered in order to prevent infection.

In our case, the fungal scleritis that developed 3 months after bleb-associated endophthalmitis was resolved by pars plana vitrectomy in combination with topical and systemic antibiotic medication. Because the causative pathogen of endophthalmitis was not detected from the aqueous humor or vitreous body samples, which were taken at the time of vitrectomy, the cause of endophthalmitis in this case was unclear. Given the fact that the growth of *P. lilacinus* was identified not only from the conjunctival samples, but also from the corneal specimen, both of which had been collected before pars plana vitrectomy, we speculate that the endophthalmitis was caused by a *P. lilacinus* infection, as well as the scleritis which developed 3 months later. However, due to the time difference between the onsets of endophthalmitis and fungal scleritis and the fact that the endophthalmitis resolved without antifungal medication, the cause of endophthalmitis may have been bacterial and the fungal scleritis may have developed sequentially.

Regarding the treatment of fungal infections involving the sclera, surgical excision of the affected sclera has been reported to be useful if the infection is unresponsive to medical treatment [17, 18]. Such excision also provides tissue for both histopathological and microbiological investigations. Pflugfelder *et al.* [18] speculated that fungi can infiltrate ocular tissues, such as the iris, cornea and lens, which in turn may serve as reservoirs for recurrent infections if not excised due to poor antifungal penetration into these tissues. In the current case, surgical excision of the affected sclera was carried out earlier, namely on the same day of initiation of antifungal medical therapy, since there were corneal infiltrates as well as numerous subconjunctival abscesses, which could have led to recurrence of the endophthalmitis. Despite the surgical excision of the affected sclera, however, the scleritis recurred in another region following the resolution of the primary lesion, most likely due to the fungal elements that remained in the sclera. Therefore, the possible recurrence of fungal scleritis in other parts of the eyeball should always be considered. The systemic administration of more effective antifungal drugs may therefore contribute to eradica-

tion of the fungal elements remaining in the sclera, although this treatment strategy appears to be difficult to apply to elderly patients due to the associated adverse effects, such as renal and hepatic dysfunctions, as shown in this case.

In conclusion, surgical intervention should be taken into consideration in cases involving signs of de-epithelialization in persistent dellen after trabeculectomy in order to prevent infection. When treating *P. lilacinus*-induced scleritis, early surgical excision of the affected sclera in combination with fungal medication has been shown to be effective. Nevertheless, it is possible that the infection may recur in another part of the eyeball after the complete resolution of the primary lesion.

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