Amniotic membrane transplantation in a patient with an impending perforated corneal ulcer caused by Streptococcus mitis: a case report

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Case report

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Abstract

Background: Streptococcus mitis (S. mitis) belongs to the viridans group streptococci, which is rarely isolated as a causative pathogen of corneal ulcers. When S. mitis causes keratitis, penetrating keratoplasty (PK) might be necessary. Herein, we demonstrated that amniotic membrane transplantation (AMT) may be an easier procedure with acceptable outcomes and with fewer complications. Case presentation: A 63-year-old female presented with a right persistent corneal ulcer that she had suffered from for the past nine months. The culture of a corneal scraping yielded S. mitis. The right eye descemetocele decreased from 3 mm in diameter to 0.8 mm in diameter after the continuous administration of topical vancomycin and ceftriaxone for two weeks. Due to the slow healing, AMT was performed. Her corneal erosion healed and gradually became clear. Her visual acuity recovered from initially counting fingers to 20/200 17 months after AMT. Conclusion: This unusual case illustrated that antibiotics plus AMT may be an effective alternative treatment instead of PK to promote epithelialization and to reduce inflammation in corneas complicated by S. mitis keratitis.

Background

Streptococcus mitis (*S. mitis*) is an alpha-hemolytic, facultative anaerobic species of the viridans group streptococci. *S. mitis* is a commensal of the human oropharynx and is also found on the skin, in the gastrointestinal tract, and in the female genital tract. Although the low virulence and pathogenicity of this bacteria are recognized, *S. mits* is considered an opportunistic pathogen that can lead to the development of severe infections, including endophthalmitis, infective endocarditis, bacteremia, upper respiratory tract infection and meningitis [1, 2].

Moreover, corneal ulcers caused by *Streptococcus mitis* are rare and have seldom been described. In previous reports, penetrating keratoplasty (PK) was usually adopted for the treatment of persistent corneal ulcers [3-5].

As an alternative treatment to reconstruct the ocular surface, amniotic membrane transplantation (AMT) has been proposed to promote epithelial healing and to reduce neovascularization, inflammation, and scarring, and this method has been demonstrated to be effective in promoting wound healing and in preventing corneal perforation in infectious keratitis [6-9]. In this case, we demonstrated that AMT may be successfully used to treat a patient with a nonhealing descemetocele caused by *S. mitis* rather than performing penetrating keratoplasty (PK).

Case Presentation

A 63-year-old Taiwanese Han female, with a history of herpes zoster ophthalmicus 18 years ago, presented to our ophthalmological clinic with the chief complaint of right eye pain. The patient had experienced right persistent corneal ulcers for nine months despite the use of biweekly therapeutic soft contact lenses along with unknown topical agents, which resulted in recurrent symptoms of ocular

redness, pain, and blurred vision. Within a few years prior to the current event, she reported repeated episodes that occurred approximately two to three times yearly of right eye redness accompanied by photophobia that resolved spontaneously . Upon the initial ocular examination, her visual acuity was counting fingers and a 3 mm × 2 mm central epithelial defect with stromal infiltration and a 1 mm × 1 mm inferonasal paracentral descemetocele of right eye were documented (Figure 1). Famciclovir (250 mg, 2 tablets, TID), topical tobramycin ointment (3.5 g/tube, BID) and levofloxacin (0.5%, 25 mg/5 mL/bottle, Q1H) were prescribed. A subsequent corneal culture yielded *S. mitis* growth. Therefore, hourly topical vancomycin (25 mg/ml) and ceftriaxone (25 mg/mL) were initiated in place of the previous antiviral and antimicrobials based on the susceptibility test.

The size of the descemetocele initially increased to 3 mm in diameter and was accompanied by the development of a 1 mm hypopyon. With the continuous administration of topical vancomycin and ceftriaxone for two weeks, the descemetocele gradually shrank to 0.8 mm × 0.8 mm, and the hypopyon resolved (Figure 2). Superficial manual keratectomy with AMT was performed [9] because of the minimal healing and the lack of further shrinkage of the descemetocele despite intensive topical antibiotic treatment (Figure 3).

During the course of the corneal ulcer treatment, the patient reported an abrupt onset of left eye redness with abundant discharge. Pterygium at eight o'clock of the cornea and 360 degree chemosis with conjunctival injection (OS) were found. Topical sulfamethoxazole (4%, TID) and fluorometholone (0.1% QID) were used, but the symptoms persisted. Therefore, the diagnostic aspiration of aqueous (OS) was performed. Fortunately, no viral DNA or organisms was identified, and the severity of the chemosis and conjunctival injection gradually improved afterwards.

In a postoperative clinic follow-up, the AM remained in situ without further epithelial defects or leakage at six months postsurgery (Figure 4). We switched the topical antibiotics to 0.5% levofloxacin and gradually tapered the dose. The cornea healed and became clear. The visual acuity was 20/200 at the last follow up, 17 months after the AMT was performed.

Discussion And Conclusions

Well-documented treatments of *S. mitis* keratitis are rare, and most of the reported cases had poor visual outcomes or were treated with PK [3-5]. *S. mitis* is a normal flora of the human oropharynx and is also found on the skin, in the gastrointestinal tract, and in the female genital tract. Despite having low virulence and pathogenicity, reports have shown that S. mitis can cause severe infections, including endophthalmitis, infective endocarditis, bacteremia, upper respiratory tract infection and meningitis [1, 2]. This organism has been identified in patients with postsurgical endophthalmitis that resulted in poor visual outcomes [10]. In addition, the viridans group streptococci is one of the most common organisms implicated in the rare corneal infectious disease infectious crystalline keratopathy [11]. Although corneal ulcers caused by *S. mitis* have seldom been described, we treated the impending perforated ulcer with antibiotics and AMT.

Previously, in a 10-year review of microbial keratitis from 1972 to 1981, *S. mitis* was reported in 7% (3/44) of polymicrobial keratitis cases and in less than 5% of the 133 cases of monomicrobial keratitis [3]. The vision of one patient was limited to 2/200 by corneal scarring after antibacterial and antifungal therapy. The final vision of another patient was 10/200 [3]. In 2005, there was a case report of a 39-year-old female who presented with an *S. mitis* corneal ulcer with total corneal opacification and a 2.5 mm x 2.5 mm descemetocele. Antibiotics were used, but eventually, it progressed to a perforated cornea and was successfully treated with PK [4]. In 2016, another case was published of an *S. mitis/oralis* corneal ulcer that occurred one year after corneal transplantation. Although broad-spectrum antibiotics were given and infection was controlled, the corneal graft was complicated by scar formation. Regrafting was subsequently performed, and the new graft remained clear [5].

Giving initial topical empiric broad-spectrum antibiotics before culture data is available is the general treatment of suppurative keratitis [12]. Surgical treatment options include tissue adhesives, tarsorrhaphy, conjunctival flaps and PK [12]. The management of a perforated corneal ulcer or descemetocele involves the repair of the mechanical disruption and the promotion of reepithelization while reducing inflammation [12, 13]. AMT is an alternative treatment for reconstructing the ocular surface, and it has been proposed to promote epithelial healing and to reduce neovascularization, inflammation, and scarring [6, 7]. Studies have reported that AMT is effective in promoting wound healing and in preventing corneal perforation in infectious keratitis, while PK can resolve the pathology but has the disadvantage of having more complications [8, 9, 12].

In this case, we described the clinical and treatment course of an impending perforated corneal ulcer caused by *S. mitis*. We also demonstrated that treatment with antibiotics and AMT was successful, without the need for PK, and this could be considered an alternative treatment for non-healing descemetoceles induced by *S. mitis*. Given the current single case report, larger-scale studies are needed for AMT to become a standard treatment modality for persistent corneal ulcers prior to PK.

Abbreviations

Streptococcus mitis: *S. mitis*, penetrating keratoplasty: PK, amniotic membrane transplantation: AMT, BID: twice a day, TID: three times a day.

Declarations

Ethics and consent to participate:

All procedures that were performed on the patient were in accordance with the Declaration of Helsinki. This case was retrospectively reviewed, and this single case report describes the course of the diagnostics and therapy but does not include data that can identify the patient. Thus, the need for ethical approval was waived.

Consent to publish:

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

Availability of data and material:

All data generated during this case report are included in this published article.

Competing interests:

The authors declare that they have no competing interests.

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Authors' contributions:

HCC contributed to the conception and study design.

LKY and HCC treated and enrolled the patient.

FCH and YJM collected and interpreted the data.

FCH drafted the manuscript.

All the authors, including FCH, YJM, LKY, HYT, CHH, HKM, WCW, and HCC, were involved in the critical revision of the manuscript, supervision of the manuscript and final approval of the submission. The first two authors (Hsiao FC and Meir YJ) contributed equally to this work.

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Figures

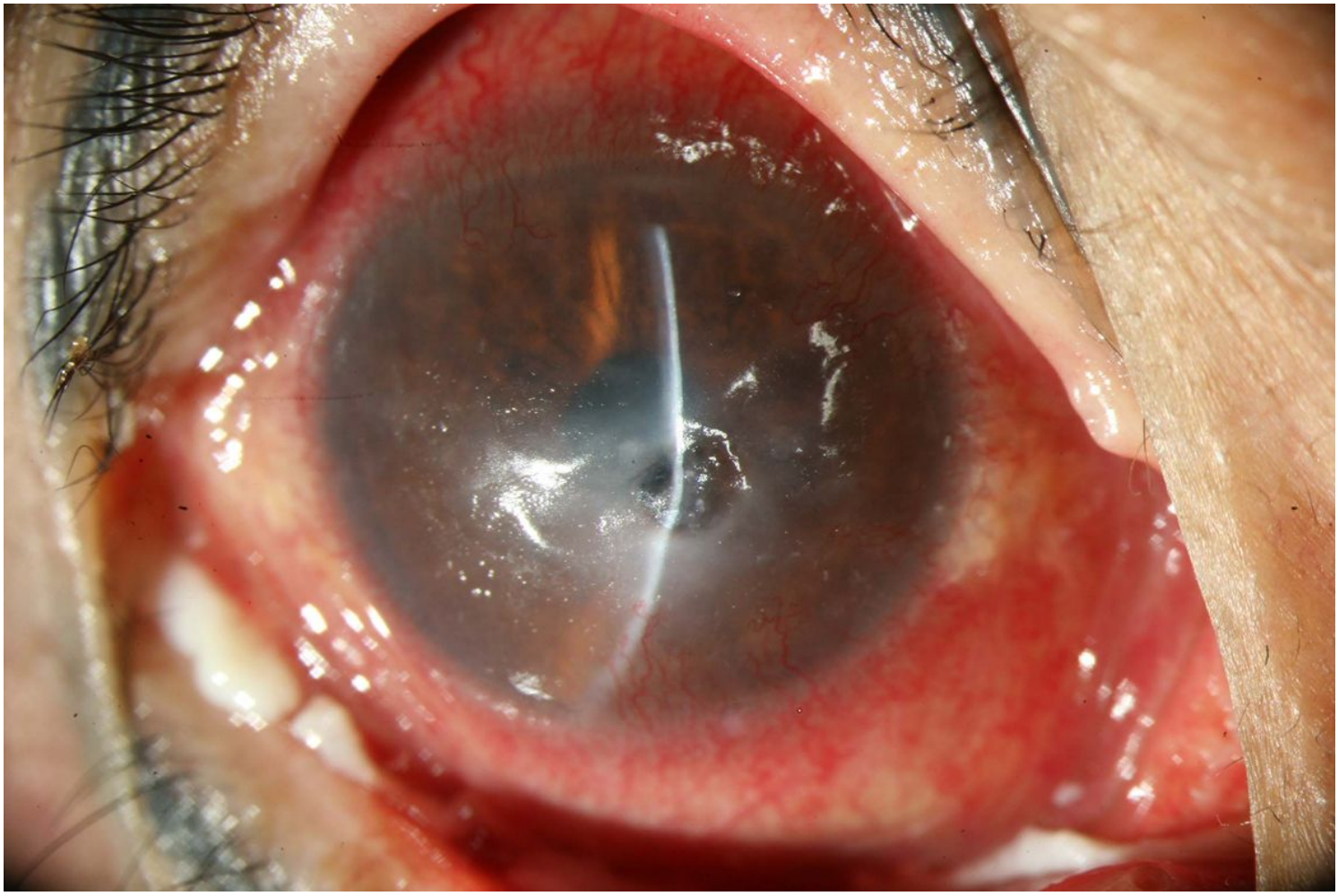

Figure 1

At the initial ocular examination, a 3 mm × 2 mm central epithelial defect with stromal infiltration and a 1 mm × 1 mm inferonasal paracentral descemetocele (OD) were observed.

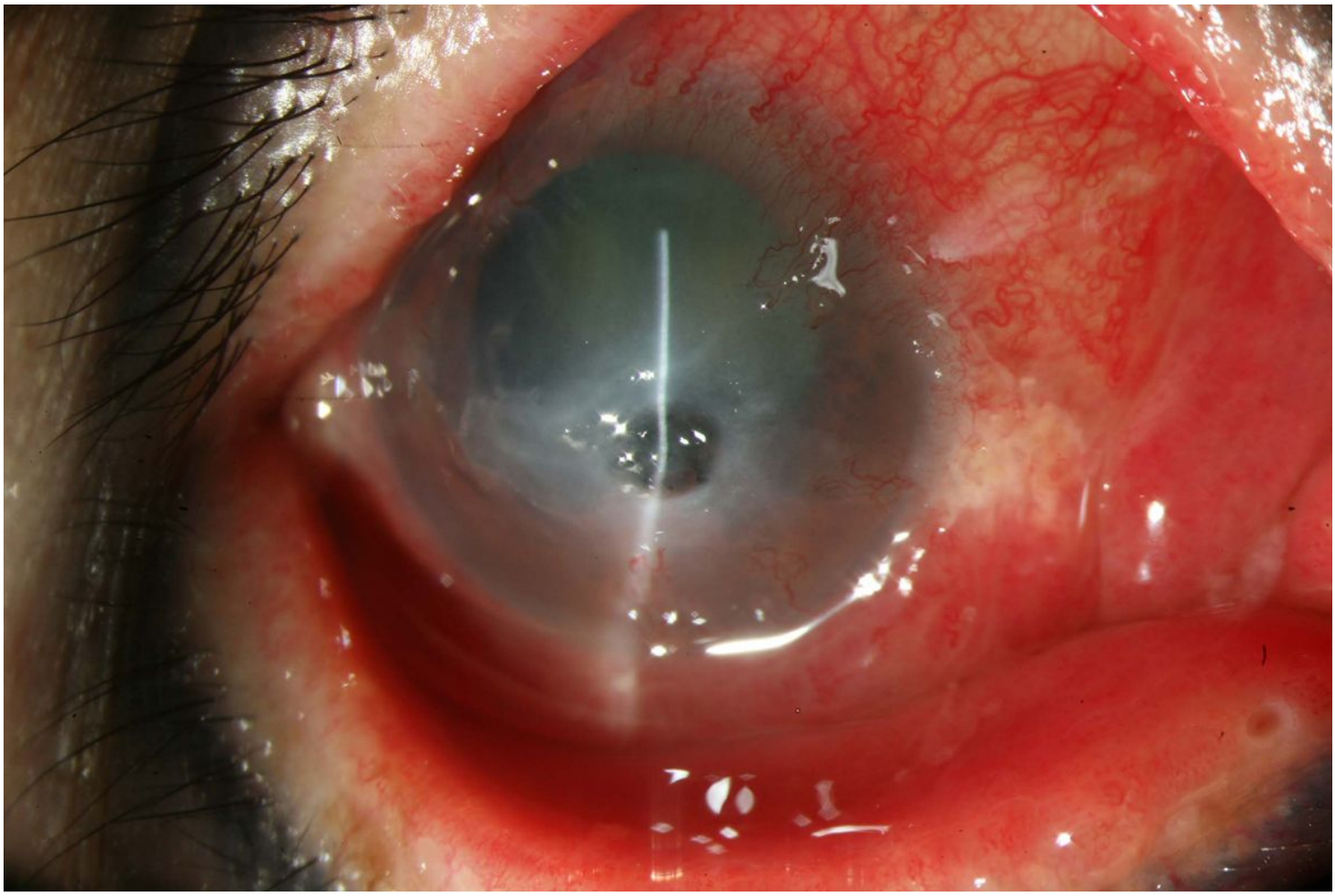

Figure 2

After the continuous administration of topical vancomycin and ceftriaxone for two weeks, the descemetocele gradually shrank to 0.8 mm × 0.8 mm, and the hypopyon resolved.

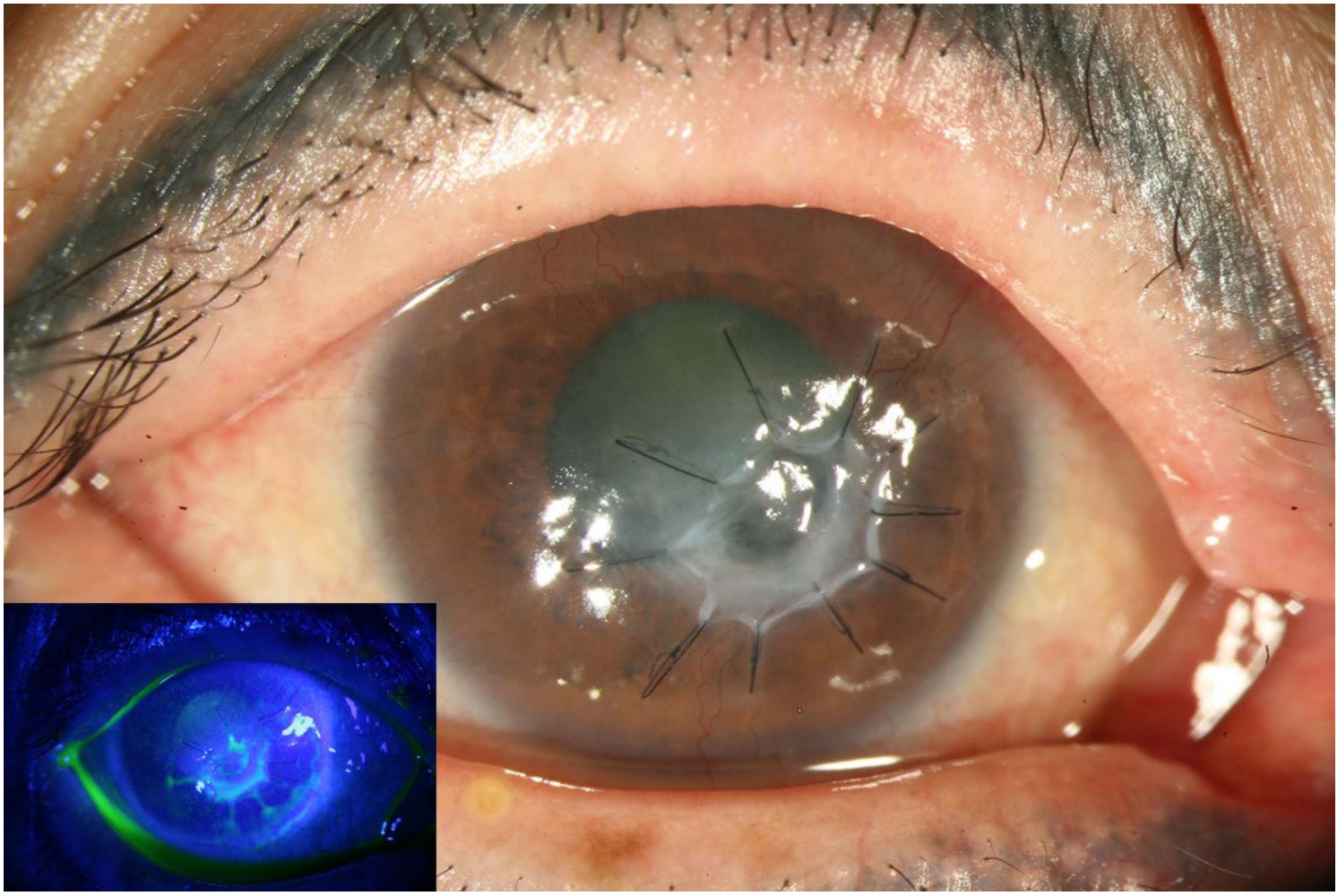

Figure 3

With superficial manual keratectomy with AMT, the descemetocele was successfully repaired with smooth epithelialization.

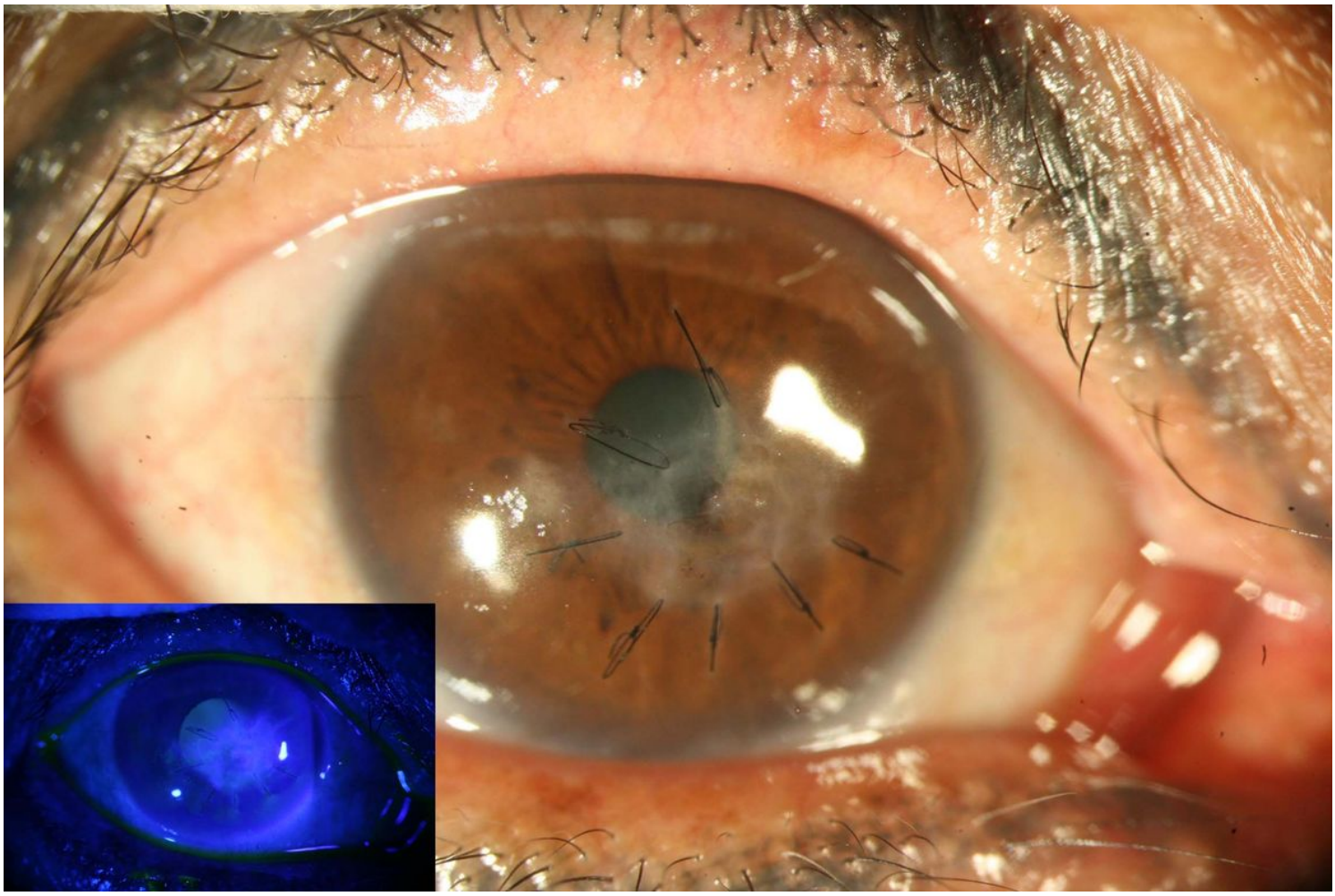

Figure 4

During the postoperative follow-up, the AM remained in situ without further epithelial defects or leakage at nine months.

Supplementary Files

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