

# Post-Traumatic Corneal Ulcer with Hypopyon and Secondary Anterior Uveitis in an Uncontrolled Diabetic



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## ABSTRACT

Corneal ulcer is a serious eye condition that can be complicated by secondary anterior uveitis, especially in patients with systemic comorbidities. A 56-year-old female with uncontrolled diabetes mellitus presented with a central corneal ulcer, stromal infiltrates, 360° neovascularization, corneal edema, and hypopyon filling half of the anterior chamber. Microscopy revealed Gram-positive bacilli with polymorphonuclear cells, indicating the presence of *Bacillus cereus*, though bacterial and fungal cultures were negative. The patient received intensive topical and systemic antimicrobials, but was subjected to hypopyon aspiration, intracameral antimicrobial injection, and amniotic membrane transplantation (AMT) with a bandage contact lens due to persistent hypopyon. Postoperatively, ocular surface stabilization and symptom relief were achieved, but the final visual acuity remained limited to light perception. This case highlights the importance of early suspicion of harmful organisms in post-traumatic keratitis, outlining the role of combined medical and surgical methods, including AMT, in preserving globe integrity.

**Keywords:** Corneal ulcer, Keratitis, Uveitis, Hypopyon, Diabetes mellitus, Case reports.

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## INTRODUCTION

Corneal ulcers are a serious eye emergency and may cause permanent visual disability, especially in developing countries, where trauma and poor presentation are the norms. In post-traumatic keratitis, the condition may develop at a very rapid pace especially in a patient with a systemic comorbid condition like diabetes mellitus. This condition impairs corneal wound healing and compromises the host's immune response.<sup>1</sup> The presence of hypopyon and secondary anterior chamber inflammation further

shows a severe or aggressive infection that requires prompt diagnosis and aggressive management.<sup>2</sup>

*Bacillus cereus* has been reported as a rare but fulminant pathogen in post-traumatic keratitis. This organism is strongly associated with vegetative trauma and is capable of causing rapid corneal melting, as well as endophthalmitis when left untreated.<sup>3</sup> However, its diagnosis is often challenging due to negative culture results and the overlapping clinical features with fungal keratitis. Early suspicion and empiric broad-spectrum antimicrobial coverage are critical.

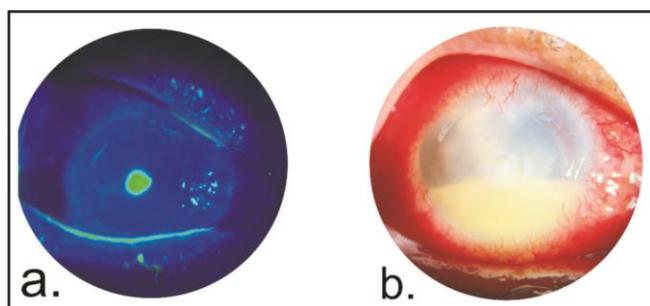
Recent studies have shown the role of amniotic membrane transplantation (AMT) as an adjunctive surgical therapy for severe infectious keratitis. AMT promotes epithelialization, reduces inflammation, and preserves globe integrity in cases of non-healing corneal ulcers or impending perforations.<sup>4,5,6</sup>

In this study, a case of post-traumatic infectious

keratitis accompanied by hypopyon and secondary anterior uveitis in a patient with uncontrolled type 2 diabetes mellitus was managed through intensive antimicrobial therapy, hypopyon aspiration, intracameral antimicrobial injections, and AMT. This case shows the diagnostic challenges in differentiating bacterial from fungal keratitis, as well as captures the value of combined medical and surgical methods in preventing corneal perforation and maintaining ocular integrity.

### Case Presentation

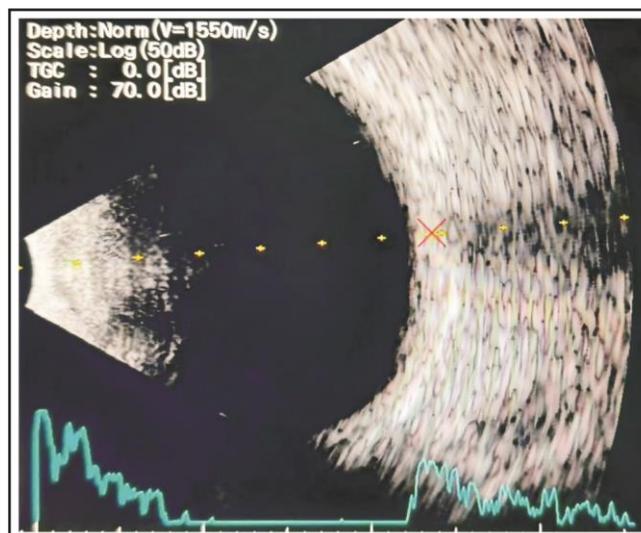
A 56-year-old woman complained of progressive whitish opacity in the right eye (OD) associated with redness and blurred vision for one week. Two months earlier, the patient sustained ocular trauma from a wooden foreign body and rinsed the eye with stagnant water. This incidence led to ocular pain, watering, discharge, and persistent blurring of vision despite initial inpatient treatment at another hospital. The medical history was significant for type 2 diabetes mellitus, newly diagnosed two months prior (HbA1c 8.1%), and hypertension grade 1. There was no history of ocular surgery or contact lens use.



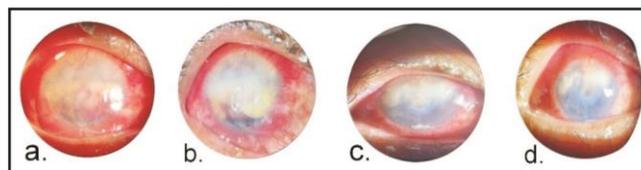
**Figure 1(a):** Fluorescein staining of the right cornea showing a central epithelial defect with underlying stromal infiltrates consistent with corneal ulcer; (b): Slit-lamp photograph at presentation showing dense central stromal infiltrates, corneal edema, 360° corneal neovascularization, and a hypopyon occupying approximately half of the anterior chamber. Documentation from Dr. Soetomo General Hospital, Surabaya, Indonesia.

On examination, the best corrected visual acuity was light perception OD and 5/7.5 OS. The right cornea showed central stromal infiltrates with an epithelial defect measuring 3 × 3 mm, surrounding edema, and 360° corneal neovascularization. Fluorescein staining was positive over the ulcer bed (Figure 1). A hypopyon occupying half of the anterior chamber was present, with associated anterior uveitis. Posterior segment evaluation with B-scan

ultrasonography showed an attached retina and no vitreous opacities (Figure 2).



**Figure 2:** B-scan ultrasonography of the right eye shows an attached retina with no vitreous opacities. Documentation from Dr. Soetomo General Hospital, Surabaya, Indonesia.



**Figure 3:** Serial slit-lamp photographs of the right eye: (a) 7 days before hypopyon aspiration, showing dense corneal infiltrates with organized hypopyon; (b) 1 day before aspiration with persistent hypopyon; (c) 7 days after aspiration and amniotic membrane transplantation, showing reduced hypopyon and surface stabilization; (d) 1 month after aspiration with resolved hypopyon and persistent central opacity. Documentation from Dr. Soetomo General Hospital, Surabaya, Indonesia.

Corneal scraping and conjunctival swab were carried out. Microscopy showed Gram-positive bacilli with polymorphonuclear cells, raising suspicion of *Bacillus cereus* infection, while no growth was observed in KOH preparation and cultures (bacterial and fungal). The patient was managed with hourly topical Moxifloxacin, topical Natamycin every 4 hours, topical Atropine 1%, and systemic Ketoconazole 200 mg twice daily. Intravenous Ciprofloxacin and subconjunctival Amikacin injections were also administered. Systemic diabetes control was optimized through endocrinology consultation, switching oral hypoglycemics to insulin.

The corneal ulcer progressed with persistent

hypopyon despite intensive therapy. The patient subsequently underwent hypopyon aspiration, intracameral injection of Cefuroxime and Fluconazole, and AMT with bandage contact lens placement under general anesthesia. Serial anterior segment photographs showed progression and resolution of hypopyon following intervention (Figure 3).

The corneal surface was stabilized with the amniotic membrane in place, hypopyon decreased, and ocular discomfort improved. However, visual acuity remained limited to light perception due to central corneal opacity.

## DISCUSSION

Post-traumatic infectious keratitis is a major cause of ocular morbidity, particularly in regions where vegetative injuries and delayed presentation are common. In this patient, the presence of a dense corneal ulcer, 360° neovascularization, and a half-chamber hypopyon was indicative of a severe infection with secondary anterior uveitis. The systemic comorbidity of poorly controlled diabetes mellitus contributed to both the susceptibility to infection and the poor corneal healing response. Diabetes has been consistently reported as an independent risk factor for worse outcomes in microbial keratitis.<sup>1</sup>

The differential diagnosis included both fungal and bacterial keratitis, as vegetative trauma strongly predisposes to filamentous fungal infection. However, repeated cultures and KOH smears were negative for fungal elements, while Gram staining showed Gram-positive bacilli, raising suspicion for *Bacillus cereus*. Although relatively uncommon, *Bacillus* keratitis is well documented in post-traumatic eyes and is characterized by rapid progression, aggressive inflammation, and a high risk of corneal perforation.<sup>3,7</sup> The clinical course of worsening hypopyon despite broad-spectrum antimicrobial therapy is consistent with the aggressive nature of this organism.

Considering the limited microbiological yield, management was necessarily empirical. Hourly topical Moxifloxacin, Natamycin, and systemic antifungals were initiated to cover both bacterial and fungal organisms, consistent with recommendations for severe keratitis with hypopyon.<sup>2</sup> The ulcer continued into an organized hypopyon regardless of this regimen, and a surgical intervention is required.

AMT has been considered as useful adjunct in acute infectious keratitis. Recent investigations ratify

its application in enhancing the healing abilities of the epithelium, limiting swelling, as well as avoiding perforation, specifically when paired with antimicrobial treatment.<sup>4,5,6</sup> In the given study, the AMT added to hypopyon aspiration and intraoperative antimicrobial injection ensured structural stabilization and symptomatic relief, but visual recovery was poor in its presence because of central corneal opaqueness.

This case highlights the significance of medical and surgical interventions in the treatment of refractory aggressive keratitis in which there is hypopyon. But one of the drawbacks is that there is no clear culture positivity of microbial cultures which is one of the pitfalls in the management of keratitis in clinical practice.

In this case, early suspicion of organisms of virulent *Bacillus cereus* should be ensured at the very beginning of the treatment of the severe post traumatic keratitis hypopyon, especially with patients having diabetes. Ocular surface stabilization with combined therapy and intensive topical/systemic antimicrobials with or without surgical intervention, as in hypopyon aspiration and AMT, can be done even in cases where the visual prognosis is still guarded.

## CONCLUSION

There exists a significant challenge in diagnosing and treating severe post-traumatic corneal ulcer that has developed hypopyon and secondary anterior uveitis, especially in patients with diabetes mellitus who have not controlled their condition. Although the culture results were unclear, the presence of Gram-positive bacilli on the smear raised suspicion of *Bacillus cereus*, a rare but aggressive infection. Ocular surface healing and preservation of the eye were achieved through aggressive antibiotic treatment combined with surgical procedures such as hypopyon drainage, intracameral antibiotic injection, and AMT. This case features the significance of early recognition, comprehensive management, and a team-based approach in preventing corneal perforation, when the visual outcome is not expected to be good.

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**Patient's Consent:** Researchers followed the guidelines set forth in the Declaration of Helsinki.

**Conflict of Interest:** Authors declared no conflict of interest.

**Availability of Data and Materials:** The data

supporting the results of this case report are available from the corresponding author upon reasonable request.

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## Authors Designation and Contribution

Chandra Prabaswara; General Practician: *Design, Literature search, Data acquisition, Manuscript preparation, Manuscript editing.*

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Ismi Zuhria; Consultant Ophthalmologist: *Design, Literature search, Manuscript preparation.*

Ida Bagus Gde Wirastana; Consultant Ophthalmologist: *Literature search, Manuscript preparation, Manuscript editing.*

