

## Case Report

### RUBBER BARK FUNGAL KERATITIS IN A CONTACT LENS WEARER

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#### ABSTRACT

*Fungal keratitis is one of the leading cause of vision threatening ocular morbidity. Due to its slow pathologic progress, it posts a clinical diagnostic challenge. The increasing trend of fungal keratitis is attributed to the use of contact lens, non-judiciary corticosteroid, and corneal trauma by vegetative matter. We report a case of fungal keratitis in a 33-year-old man who has 2 risk factors; a contact lens wearer and corneal trauma by vegetative matter from rubber bark. The initial symptoms mimic bacterial keratitis. A presumptive diagnosis of fungal keratitis was made on 5 days after symptoms started based on the characteristic Slit-lamp biomicroscopic signs and treatment with topical as well as systemic anti-fungal drugs was started. In the absence of fungal elements and a positive culture, recognizing the characteristic appearance enable immediate treatment and minimizing complication, resulting in good outcome.*

#### INTRODUCTION

Fungal keratitis is a severe corneal infection, with more than one million people affected per year worldwide [1]. Inoue et al (2022) report that in Japan fungal keratitis accounts for 6.3% of the total for infectious keratitis [2]. The causative fungi include species of *Candida* (43.6%), *Fusarium* (24.5%), *Alternaria* (6.4%), and *Aspergillus* (3.2%). The increasing trend of fungal keratitis is attributed to the use of contact lens, non-judiciary corticosteroid, and corneal trauma by vegetative matter in agriculture sector [2].

#### CASE PRESENTATION

A 33-year-old man, a contact lens-wearer, experienced severe pain, redness and tearing of the right eye for 2 days prior presentation. Three days prior, an apparent foreign body entered his right eye. According to him he immediately cleaned his contact lens but reapplied and continued using the same extended contact lens throughout the night. He experienced pain on waking up but tolerable. He applied eye ointment which he obtained over the counter.

The next morning his right eye became swollen and painful with excessive tearing. The symptoms persisted even after removing the contact lens. He sought treatment at a primary care clinic, was prescribed with topical antibiotic and referred to the hospital for

consultation with an ophthalmologist. He presented to the ophthalmology clinic the next day 3 after the initial symptoms. By then the right eye swelling and pain had become worse. The tearing was excessive associated with foreign body sensation, however there was no discharge. When he forced open his right eye, he realized than his right vision was very blurry. He had been using extended wear contact lens for the past one year. He admitted that he usually sleeps wearing the contact lens and had never experience any problem. He started wearing myopic correction from the age of 12 years. Review of the patient's medical history revealed no significant past medical or surgical history however he is a smoker consuming half a pack daily for the past 10 years.

On ocular examination, his right best corrected visual acuity (BCVA) was only counting finger at 1 foot. His left BCVA was 6/9. The right anterior segment examination revealed upper and lower lid swelling, excessive tearing was noted. There was no discharge.

The right eye appeared severely inflamed, the conjunctiva was hyperaemic and congested, with conjunctival and circumcorneal injection. Corneal ulcer with surrounding stromal edema, measuring 5 x 4 mm, with epithelial defect of 4 x 3 mm (Figure 1) was observed. The margin was hazy, the infiltrate extended inferiorly, encroaching the pupillary area.

The hypopyon was present inferiorly. The right intra-ocular pressure (IOP) was slightly higher, 21 mmHg compared to 14 mmHg in the left eye. The left anterior segment examination was unremarkable.

A diagnosis of right bacterial keratitis was then made. The patient was admitted and started with round the clock topical Ceftazidime 5% and topical fortified Gentamicin (15mg/1ml) hourly as well topical Homatropine 2% three times a day. The congestion was less after 2 days. The slit-lamp examination however showed more dense stromal infiltrate with feathery margin (Figure 2).

The patient was initially treated for presumed bacterial keratitis, however on day 5 the appearance was suggestive of Fungal keratitis. Review of the history the patient revealed that he had been working as a rubber tapper for the last few months and the foreign body that entered his right eye were vegetative matter from the rubber bark.

The patient was additionally prescribed with topical Amphotericin B 0.15% 2-hourly and oral fluconazole 100 mg BD for 2 weeks. The keratitis showed improvement though the gram stain and culture for fungus was negative.

Of note the topical antibiotics was not stopped as the initial presentation was more of a bacterial keratitis though gram stain as well as culture was negative. Negative culture from corneal scrapings is common as sample are very small and in this case patient was partially treated prior his presentation to the ophthalmologist.

Right anterior segment at 3 months showed a quiet but dense corneal scarring involving the visual axis (Figure 4). Right BCVA was counting finger at 2 feet and the right IOP was 16 mm Hg. Patient was planned for penetrating keratoplasty in 3 months.



Figure 1: 3 days after initial symptoms: corneal ulcer measuring 5 x 4 mm with epithelial defect, endothelial striae and hypopyon.

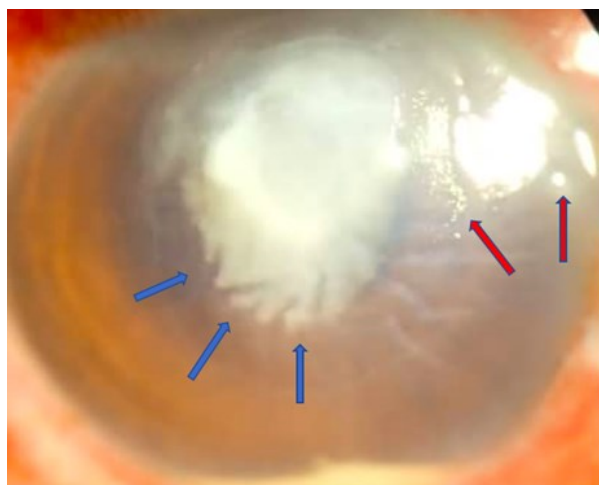
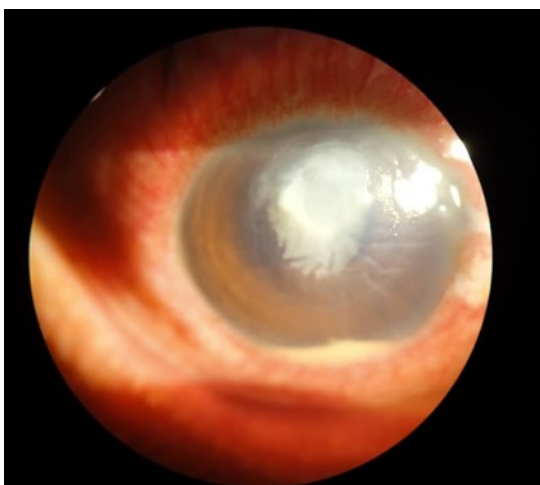


Figure 2: 5 days after initial symptoms and 2 days after treatment with topical antibiotics

2A: Cornea ulcer shows more dense stromal infiltrate with feathery margin, and persistent hypopyon.

2B: Prominent feathery stromal infiltrate (blue arrows) covering the pupillary area, satellite lesions (red arrows), endothelial striae and plaque



Figure 3 : The appearance 5 days following treatment with topical and systemic antifungal medication. The congestion is less, the margin of the ulcer is more well-defined

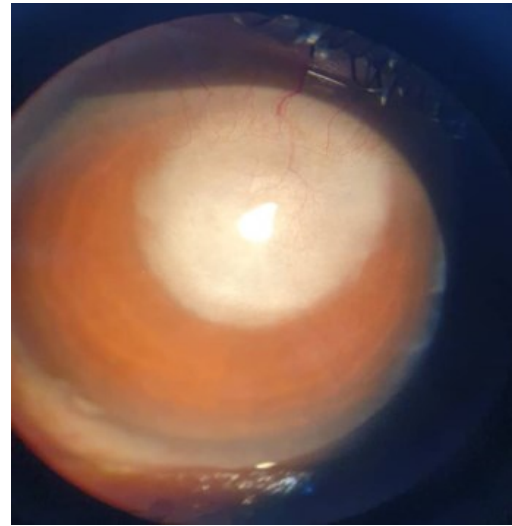


Figure 4 : At 3 months: Dense corneal scarring involving the visual axis.

## DISCUSSION

Fungal keratitis has significant public health and socioeconomic implication. Estimates suggest a global incidence of 1 million cases annually [1]. Annual incidence varies widely by region, with the highest rates in developing countries with warm and humid climates. Fungal keratitis disproportionately afflicts working-age adults and the poor living in rural area in the tropics and subtropics. Most cases occur secondary to ocular trauma, from organic or vegetative matter in the farm or plantation. Traumatizing agents come from a variety of plant and animal sources [2]. In Malaysia, a study done in 2021 by Chow Tze Suen et al found that ocular trauma is the main predisposing factor and fungi as causative organism in 9.6% [3]. Other risk factors include contact lens wear, male gender, prior eye surgery, pre-existing eye disease, diabetes mellitus, corticosteroid use, and immunosuppressive states such as HIV/AIDS [4].

Our patient's risk factors include both trauma by vegetative matter and contact lens wear. Contact lens wear is well known to increase the risk of microbial keratitis because of multiple factors, including decreased tear exchange, corneal irritation, corneal epithelial layer thinning, disruption of normal corneal epithelial cell shedding [5]. These factors are compounded by poor hygienic practices.

Direct observation of fungal hyphae by microscopy and culture from corneal scrapings are the gold standards for diagnosing fungal keratitis. Cultures develop in 48-72 hours, although it can take up to 14 to 35 days. Thus, medical therapy is initiated early based on clinical suspicion and microscopic findings of smears. In our patient the corneal scraping showed no fungal element on gram staining, and no fungus or bacteria grew on the culture. The treatment was initiated based on clinical suspicion, the risk factors the patient had,

and the development of characteristic feathery stromal infiltrate 3 days after Topical antibiotics was started.

Medical management given include fortified antifungal ophthalmic drops, the topical Amphotericin B 0.15% together with cycloplegic and oral Fluconazole 200mg daily for 2 weeks. Topical antifungals do not penetrate the cornea well, especially through an intact corneal epithelium. The combination of topical, intrastromal injection and oral antifungals administration increase antifungal delivery [6]. Our patient responded well to the treatment given, apart from dense central corneal scarring, no complication such as corneal thinning or perforation occurred. Additional surgical management planned for this patient is a timely penetrating keratoplasty to improve his right vision.

Prevention and early identification of fungal keratitis is a key for farm or industrial workers at risk. Simple interventions such as providing and emphasizing the use of protective eyewear will lower the incidence of corneal trauma by vegetative matter, namely in our case, the rubber bark substance or dust during rubber tapping.

Wearing contact lens is becoming more common with a growing number of indications, including refractive error correction, restorative reasons and cosmetic uses which is becoming very popular as it changes or enhance a person's appearance. Among the various risk factors for contact lens-induced infectious keratitis, the two most frequent are poor hygiene and overnight wear [8]. Extended wear and unskilled wearer increase the risk. Education on proper contact lens hygienic practices by eye care professionals is very crucial. Recognising the symptoms and signs that require immediate medical attention can prevent serious bacterial or fungal infection. Our patient admitted to contact lens overwear and abuse. He sleeps with

his contact lens most of the time and was unable to properly adhere to the correct practice of contact lens care. Out of ignorance, he continued to use the contact lens and delayed in seeking medical help despite the ocular trauma by the vegetative rubber bark.

## CONCLUSION

The knowledge of the clinical characteristics of fungal keratitis helps in early diagnosis and overall reduction in complications and subsequent visual morbidity. It is important to recognise the common risk factors which include vegetative trauma, widespread contact lens use, prolonged corticosteroid use, and systemic disease such as diabetes mellitus.

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## DECLARATION

### Competing interests

The authors have no relevant financial or non-financial interests to disclose.

### Consent to Participate

Informed consent was obtained from the patient.

### Consent to Publish

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

## REFERENCES

1. Brown L, Leck AK, Gichangi M, Burton MJ, Denning DW. The global incidence and diagnosis of fungal keratitis. *Lancet Infect Dis.* 2021;21(3):49–57.
2. Inoue Y, Ohashi Y, Shimomura Y, Sotozono C, Hatano H, Fukuda M, Eguchi H, Araki-Sasaki K, Suzuki T, Hoshi S, Asari S, Sunada A, Kimura K, Yaguchi T, Makimura K. Multicenter prospective observational study of fungal keratitis in Japan: analyses of culture-positive cases. *Jpn J Ophthalmol.* 2022;66(3):227–239.
3. Chow Tze Suen, Tan Chew Ean, Norshamsiah Md Din. A 5-year Retrospective Review of Corneal Ulcers in Northern Malaysia. *The International Journal of Medical Sciences.* 2021; 6(1): 8-13
4. Khor WB, Prajna VN, Garg P, Mehta JS, Xie L, Liu Z, Padilla MDB, Joo CK, Inoue Y, Goseyarakwong P, Hu FR, Nishida K, Kinoshita S, Puangsricharern V, Tan AL, Beuerman R, Young A, Sharma N, Haaland B, Mah FS, Tu EY, Stapleton FJ, Abbott RL, Tan DT. The Asia Cornea Society Infectious Keratitis Study: A prospective multicenter study of infectious Keratitis in Asia. *Am J Ophthalmol.* 2018;195:161–170.
5. Slowik M, Biernat MM, Urbaniak-Kujda D, Kapelko-Slowik K, Misiuk-Hojlo M. Mycotic Infections of the Eye. *Adv Clin Exp Med.* 2015; 24(6): 1113 - 7.
6. Yogesh Acharya, Bhawana Achaya, Priyanka Karki. Fungal keratitis: Study of increasing trend and common determinants. *Nepal J Epidemiol* 2017 Jun; 7(2): 685–693.
7. Lim CH, Stapleton F, Mehta JS. Review of contact lens-related complication. *Eye Contact Lens.* 2018;44 Suppl 2:0.
8. Alamillo-Velazquez J, Ruiz-Lozano RE, Hernandez-Camarena JC, Rodriguez-Garcia A. Contact lens associated infectious keratitis: Update on diagnosis and therapy; *IntechOpen.* United Kingdom: 2021. Pp 3-33.