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Original Research Article

# A Clinical Profile of Fungal Corneal Ulcer at BMIMS, Pawapuri, Nalanda, Bihar

**Farmood Alam[1], Arun Kumar Sinha[2], Amit Rajan[3]**

[1] Senior Resident, Department of Ophthalmology, Bhagwan Mahavir Institute of Medical Sciences (BMIMS), Pawapuri, Nalanda, Bihar.

[2] Professor and Head of Department, Department of Ophthalmology, Bhagwan Mahavir Institute of Medical Sciences (BMIMS), Pawapuri, Nalanda, Bihar.

[3] Senior Resident, Department of Ophthalmology, Bhagwan Mahavir Institute of Medical Sciences (BMIMS), Pawapuri, Nalanda, Bihar.

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**Corresponding author: Dr Arun Kumar Sinha**

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## Abstract

**Background:** A corneal irritation brought on by fungi is called a fungal keratitis. This infection can cause significant visual damage or perhaps blindness and is challenging to treat. Although it is found throughout, the tropics and subtropics are where it is most prevalent. In tropical developing nations, corneal ulcers rank second after cataracts as the leading cause of avoidable blindness.

**Methods:** From March 2020 to February 2022, a retrospective study involving 50 instances of fungal corneal ulcers was conducted at BMIMS, Pawapuri, Nalanda, Bihar, by the department of ophthalmology in cooperation with the department of microbiology.

**Results:** The age group of 41 to 60 years saw the highest prevalence of ulcers, and the majority of those affected were men. Trauma was the most prevalent predisposing factor. Slough was the most frequent clinical characteristic, followed by satellite lesions, hypopyon, perforation, decreased intraocular tension, and vascularization.

**Conclusion:** Fungal keratitis is typically difficult to diagnose. Unquestionably, the ophthalmologist's clinical suspicion is a crucial factor in determining the diagnosis of a fungal infection of the cornea. For the laboratory diagnosis of fungal keratitis, a wide range of conventional and molecular methods are currently available. To prevent blindness, early diagnosis and effective treatment are crucial.

**Keywords:** Corneal, Fungal Keratitis, Microbiology.

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## Introduction

A corneal ulcer is described as a rupture of the epithelium with stromal infiltration beneath and surrounding it. In many of the world's developing nations, corneal ulcers are a significant cause of monocular blindness and visual impairment. Worldwide, it has an impact on both men and women of all ages. A corneal ulcer, which occurs more frequently, is a seriously infectious condition that requires prompt medical intervention in order to prevent long-term vision loss. The efficient therapy of patients with corneal ulcers would therefore greatly benefit from

knowledge of the causative agents and other susceptibility variables. It could be either infectious or not. There are more infectious corneal ulcers than non-infectious sources. Bacterial, viral, fungal, and parasitic infections can all be the reason. Non-infectious reasons could include trauma, exposure, or a loss of corneal feeling. The patient typically complains of rapid onset pain, redness, wetness, and blurred vision. Patients typically have histories of trauma, dust exposure, or eye rubbing. Small ulcers heal quickly if the patient has a strong immune system, but if the ulcer is linked to a larger condition or old age, or if the immune system is impaired, it typically gets worse.

## Material and Methods

A study on 50 patients who attended Ophthalmology OPD and IPD in clinically suggested cases of corneal ulceration was conducted by the Department of Ophthalmology with assistance from the Department of Microbiology at the Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar from March 2020 to February 2022. The patient's complete clinical history was obtained. The ophthalmologist thoroughly examined the damaged eye using a slit lamp and recorded the details of the ulcer. The eye was washed with sterile normal saline to eliminate any necrotic exudates following a thorough clinical examination. Following that, 2-3 drops of 4% lignocaine hydroxide without a preservative were used to locally anaesthetize the eye. With the help of a sterile Bard Parker blade no. 15 or Kimura's Scapula, scrapings of the corneal ulcer were taken. To gather as much material as possible, the ulcer's edges and base were extensively scraped.

The corneal scraping was directly examined under the microscope using 10% potassium hydroxide (KOH) wet mount and Calcofluor white staining. The scrapings were seeded on Blood agar for bacterial isolate culture and incubated at $37^0$C for 18 to 24 hours. The bacteria were then identified based on microscopic morphology, staining features, and validated by setting up a battery of biochemical tests. The scrapings were immediately inoculated on two slants of Sabourand's dextrose agar (With gentamycin and chloramphenicol) and incubated at $25^0$C and $37^0$C, respectively, for fungal culture. Based on colony characteristics, development rate, and microscopic analysis using lactophenol cotton blue stain wet mount, identification was made.

## Results

**Table 1: Age Incidence**

| Age GP In Years | Number of cases | Percentage |
|---|---|---|
| 0-10 | 3 | 6% |
| 11-20 | 6 | 12% |
| 21-30 | 6 | 12% |
| 31-40 | 10 | 20% |
| 41-50 | 12 | 24% |
| 51-60 | 6 | 12% |
| 61-70 | 2 | 4% |
| 71-80 | 5 | 10% |
| **Total** | **50** | |

All age groups are affected but elderly age group 41-60 years (40%) are most commonly affected.

**Table 2: Sex Incidences**

| Sex | Number of cases | Percentage |
|---|---|---|
| Male | 36 | 72% |
| Female | 14 | 28% |

Males were predominantly affected. The male – female ratio was 2.70:1.

**Table 3: Incidence of Predisposing Factors**

| Predisposing Factor | No. of ulcers | Percent | Contributing factors | Percentage |
|---|---|---|---|---|
| Trauma | 40 | 80 | 15 | 30% |
| Foreign Body | 10 | 20 | 20 | 40% |

The most frequent predisposing factor for patients was ocular trauma, and 30% of these individuals had one or more contributing factors. Foreign bodies in the eyes were a predisposing factor in 33.3% of patients. One or more contributing factors were present in 40% of these cases.

Entropion, chronic dacrocystitis, past corneal opacity, the use of an antibiotic or steroid before a trauma or foreign substance, diabetes mellitus, alcoholism, or a previous sickness are some of these risk factors.

**Table 4: Nature of Trauma**

| Object | No. of patients | Percentage |
|---|---|---|
| Vegetable matter | 27 | 54% |
| Animal hair[cattle] | 4 | 8% |
| Self-inflicted[accidently] | 2 | 4% |
| Foreign body | 17 | 34% |

**Table 5: Clinical features and associated findings**

| Findings | No. of Patients | Percentage |
|---|---|---|
| Slough | 50 | 100 |
| Hypopyon | 42 | 80 |
| Intraocular | | |
| Tension | 39 | 78 |
| Normal | 7 | 14 |
| Raised | 2 | 4 |
| Lowered | 30 | 60 |
| Satellite lesions | 20 | 40 |
| Vascularization | 2 | 4 |
| Perforation | 34 | 68 |

Most common clinical feature was slough followed by hypopyon, perforation, lowered intraocular tension, satellite lesions and vascularization respectively.

## Discussion

In developing nations, infectious keratitis continues to be a major contributor to corneal ulcers. Studies have revealed contradictory patterns in fungal keratitis risk factors, microbiological profiles, and surgical outcomes [1,2].

In our analysis, ocular trauma was the most frequent predisposing factor, affecting the majority of patients; 30% of these patients also had one or more contributing variables. 20% of patients had an ocular foreign body as a risk factor. One or more contributing

factors were present in 40% of these cases. Entropion, chronic dacrocystitis, previous corneal opacity, the use of antibiotics or steroids prior to trauma or the introduction of a foreign body, diabetes mellitus, alcoholism, or a previous illness are some of these risk factors, which are similar to those found in a study by Sharma K *et al* [3]. They discovered that topical steroids (19.23%) and diabetes mellitus (7.69%) were the two most prevalent predisposing factors, with ocular trauma (66.3%) coming in second.

Ocular trauma accounted for 78.5% of patients, according to Kumar *et al*[5] and Katara RS *et al*[4] (trauma 44.45%, diabetes mellitus 29.5%, contact lens wearers 14.82%, and steroids 3.70%). This might be because the majority of the study patients worked in an industry where eye injuries were quite common agriculture. Use of topical steroids (14.6%) was another risk factor. This might be because steroid eye drops are widely available in our nation. Additionally, individuals continue to use these eye drops constantly for prolonged periods of time due to illiteracy, frequently even without a prescription.

In our study, the most frequent cause of trauma was vegetable matter, which is also the most frequent type of trauma. Animal hair, a foreign body, and self-inflicted [accidental] injuries were next, which is similar to Sharma A *et al*[3]. Paddy leaf, sugarcane leaf, and other vegetable-related trauma accounted for 50% and 16.6% of all cases, respectively. According to Sharma K *et al*. [3] (54.54%) and Katara RS *et al*. [4] (62%), this is accurate. Since these two crops make up the majority of the farming community and are the main agricultural products in this area, injury from sugarcane and paddy leaf predominates. Because of their length, sugarcane leaves can readily cause eye injuries as the crop is being harvested. The most frequent clinical feature in the current investigation was slough, which was followed by hypopyon, perforation, decreased intraocular tension, satellite lesions, and vascularization, in that order. The most frequent clinical signs of fungal keratitis were redness (81.25%), impaired or decreased vision (81.25%), discomfort (68.7%), and uneven feathery edges (75%) The most frequent symptoms of bacterial keratitis were pain (87.5%), redness (87.5%), lacrimation (62.5%), and hypopyon (37.5%) [3].

Similar results were obtained by Ibrahim *et al*.[6] (Red eye - Bacterial 89.22% fungal 87%, Pain - Bacterial 90.32% fungal 87.55%, Photophobia - Bacterial 67.74% fungus 86.67%, Poor vision - Bacterial 71.67%). Fungal-93.49%, Hypopyon (Bacterial 36% Fungal 16%), and Thomas *et al*. [7] (Serrated margins- fungal 79% bacterial 48%, Hypopyon- fungal 48% bacterial 65%, dry texture- fungal 44% bacterial 28%) are the three most prevalent types of growth. The majority of the time, hyphal pattern, serrated margins, elevated slough, dry textured slough, and satellite lesions indicate a fungal aetiology.

A high frequency of mixed bacterial-fungal corneal infections was discovered by Joanne W *et al*.[8], accounting for 24 of 63 cases (38%). This is a lot higher than the bacterial-fungal infection prevalence reported in the Northeastern United States (11/61, 18%)[9]. The high proportion of patients in our sample who had previously had PKP may have contributed to the increased prevalence of polymicrobial infections because these individuals were probably more vulnerable to super infections. When symptoms are more pronounced, a bacterial aetiology is thought to be the cause.

The clinical characteristics include flat, dry slough, well-defined margins, hypopyon, keratic precipitates, flare or cells in the anterior chamber (AC), and deep lesions, but real-world experience treating fungal

keratitis cases reveals that the clinical characteristics are not always consistent with the textbook description. Although certain clinical features of corneal ulcers may point to a particular pathogen, a valid diagnosis cannot be determined only based on clinical features; microbiological tests should be carried out.

## Conclusion

Fungal keratitis is a preventable, vision-threatening condition that nonetheless accounts for a sizable fraction of daily new cases and places a significant strain on healthcare resources. To reduce ocular morbidity and avoid complications, it is crucial to confirm the microbiological diagnosis because the clinical presentations of bacterial and fungal corneal ulcers frequently overlap.

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