ORIGINAL ARTICLE

# Mycotic keratitis in a tertiary care hospital in rural India

**Latha Gouravalingappa, Kethinieni Komaleeswari, Manjula Sivaprakasam**

Department of Microbiology, Peoples Education Society Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh, India

## ABSTRACT

**Background:** Mycotic keratitis is an important cause of corneal blindness in developing countries including India. It is more common in the tropics and subtropical regions. A retrospective study was done in all patients with clinically suspected fungal keratitis at Peoples Education Society Medical College and Research Institute Hospital, Kuppam, Andhra Pradesh from January 2011 to December 2013 to determine the causative agents and to identify the predisposing factors of mycotic keratitis. Out of 63 cases with corneal ulcer, 39 cases were diagnosed with mycotic keratitis by culture (36 cases) or by potassium hydroxide preparation (three cases). Males were more commonly affected and were mostly in the age group above 50 years Fusarium species (55%) was the most common fungus isolated followed by *Aspergillus flavus* (22%). Direct microscopic detection of fungal structures in corneal scrapings permits a rapid presumptive diagnosis and early institution of antifungal therapy which is necessary to prevent blindness.

**Key words:** Aspergillus, corneal infections, Fusarium, mycotic keratitis

## INTRODUCTION

Corneal infection is the most common cause of blindness in developing countries. The World Health Organization has estimated that about 1.5-2.0 million new cases of monocular blindness occur every year.[1] India being a tropical agricultural country has a higher prevalence of fungal keratitis. It is one of the major causes of corneal blindness in this region, because of the problems in managing mycotic corneal ulcer in remote rural areas.[2]

Many microorganisms like bacteria, virus, protozoa, chlamydia and fungi can cause keratitis leading to corneal ulcers. Mycotic keratitis is an infection caused by fungi that leads to inflammation and ulceration of cornea usually following trauma or treatment for a bacterial infection with steroids or antibiotics. Filamentous fungi are frequent causes of fungal corneal ulcers in humans.[3] Symptoms are usually non-specific, although possibly more prolonged in duration (5-10 days) than bacterial ulcers.[4]

Fungal infections of the cornea must be promptly recognized to initiate treatment and facilitate complete recovery. It needs establishment of clinical diagnosis and isolation of the etiologic fungal agent in the laboratory and treating the keratitis effectively with appropriate antifungal agents.[5] Early diagnosis and treatment are important in preventing complication such as hypopyon formation, endopthalamitis or loss of vision.[6]

Access this article online

Quick Response Code:

Website: www.jacmjournal.org

DOI: 10.4103/0972-1282.158783

## MATERIALS AND METHODS

### Aims and Objectives

To find the prevalence of mycotic keratitis at Peoples Education Society Institute of Medical Sciences and Research Hospital in Kuppam, rural South India.

This retrospective study was done by collecting laboratory and clinical data from January 2011 to December 2013. All clinically diagnosed cases of mycotic keratitis who attended the Ophthalmology Outpatient Department were included in this study. A detailed history of present illness was collected from records of all patients, with special reference to occupation, trauma, medication used on the eye, any surgical intervention, immunosuppression, and use of cosmetic or therapeutic contact lenses. In the outpatient department, the procedure includes a detailed ocular examination and slit lamp biomicroscopy after which corneal scrapings are aseptically collected directly from each ulcer after instillation of local anesthetic drops using kimura spatula under direct vision through slit lamp or

**Address for correspondence:** Mrs. Kethinieni Komaleeswari, E-mail: sri_komu@yahoo.co.in

operating microscope. Care is taken to take the scrapings from the leading edge and base of the ulcer.

In the microbiology lab, direct microscopy is done on all specimens for fungal culture, by 10% potassium hydroxide (KOH) examination and gram staining, The material is then inoculated onto the surface of blood agar and Sabourauds dextrose agar in the form of C streaks; growth occurring on the C streaks only is considered to be significant. All the media are incubated at 37°C and 25°C and examined daily for a period of 4 weeks. Although fungal growth is usually seen within 1-week, negative culture media may require incubation for up to 4 weeks. Cultures are checked every day during the 1st week and twice a week for the next 3 weeks. Any growth present on the medium is identified by standard laboratory techniques viz., the rate of growth, colony morphology and microscopic appearances in lacto phenol cotton blue mount and slide culture.

## RESULTS

A total of 63 cases were diagnosed with corneal ulcer from January 2011 to December 2013. Fungal elements were seen in 39 suspected cases (KOH preparation and Gram's staining). However only 36 cases showed fungal growth in culture. Mycelial Fungi were isolated in 28 cases, yeast in six cases and dematiaceous fungi in two cases. Out of the 36 culture positive cases the most frequent agent isolated was Fusarium species (55%) followed by *Aspergillus flavus* (22%), Candida (16%) and Alternaria (6%) [Table 1].

The prevalence was more in the age group of above 50 in both the sexes. Males (39%) were more affected than females (17%). Patients were either farmers or manual laborers from rural agricultural areas. Fungal corneal ulcers are caused by trauma, particularly with vegetable matter as well as chemical injury, contact lenses and infections.

## DISCUSSION

Mycotic keratitis has emerged as a major ophthalmic problem since its recognition in 1879. Fungal corneal ulcer is common in India due to the tropical climate and a large agrarian population that is at risk. Trauma to the eye and therapy with antibiotics and corticosteroids renders the eyes susceptible to infection with various fungi.[7] Trauma was the most common predisposing factor observed in our study. In this study mycotic keratitis was predominantly due to the filamentous fungi, namely Fusarium spp. (37-62%) and *Aspergillus flavus* (27%). Fusarium was the most common isolate that has been reported from South India.[8]

**Table 1: Distribution of various fungal species in patients with mycotic keratitis**

| Type of fungi | Number of cases (n=36) | Percentage |
|---|---|---|
| **Filamentous fungi** | | |
| Fusarium spp | 20 | 55 |
| Aspergillus flavus | 8 | 22 |
| **Yeast like fungi** | | |
| Candida spp | 6 | 16 |
| **Dematiaceous fungi** | | |
| Alternaria | 2 | 6 |

A large number of studies from India have reported the epidemiological and microbiological profile of fungal keratitis. The prevalence and spectrum of fungi associated with mycotic keratitis in India varies in different regions. The Southern and Western regions have reported a prevalence of 36.7% and 36.3% respectively whereas Calcutta and North Eastern region have a low prevalence (7.3% and 5.6%). The findings of this study also show a higher prevalence (61%) as per the reports from South India.[9]

Across the country mycotic keratitis seems to be more prevalent in males, mostly farmers. In most of the studies it is reported that mycotic keratitis is predominant in young adults. The age distribution in our study was between 19 and 80 years but the highest incidence was found in the age group of above 50 (50%).

Fungal keratitis can be diagnosed clinically and by laboratory methods. Mycological study on clinically suspected cases of mycotic keratitis revealed that in all the 36 cases the fungus was demonstrated by both microscopy and culture. In three cases culture did not yield any yeast despite being positive by microscopy. This observation may be due to the fact that viable fungus may not be present in all the areas of the ulcer. Treatment from the case records was identified as topical therapy with Natamycin eye drops (5%) and all the cases were found to have recovered since they were identified and treated at the early stages.

Rapid, intensive, treatment should be started as an emergency procedure. If diagnosis and treatment are delayed, the ulcer spread into the surrounding areas with ultimate opacity of the cornea leading to blindness. No treatment is available for opacity other than keratoplasty. In this scenario, early detection and accurate diagnosis of the corneal ulcer with the available tools, makes the scar as small as possible and try to retain vision.

## CONCLUSION

As fungal infections of the eye are common in our eye care system and laboratory support available is crucial

in preventing blindness, comprehensive periodic reports from different geographical areas would help to record the prevalence which would aid in planning and providing better treatment strategies.

## REFERENCES


1. Whitcher JP, Srinivasan M, Upadhyay MP. Corneal blindness: A global perspective. Bull World Health Organ 2001;79:214-21.
2. Deshpande SD, Koppikar GV. A study of mycotic keratitis in Mumbai. Indian J Pathol Microbiol 1999;42:81-7.
3. Vemuganti GK, Garg P, Gopinathan U, Naduvilath TJ, John RK, Buddi R, *et al.* Evaluation of agent and host factors in progression of mycotic keratitis: A histologic and microbiologic study of 167 corneal buttons. Ophthalmology 2002;109:1538-46.
4. Poria VC, Bharad VR, Dongre DS, Kulkarni MV. Study of mycotic keratitis. Indian J Ophthalmol 1985;33:229-31.
5. Sharma S, Srinivasan M, George C. The current status of *Fusarium* species in mycotic keratitis in south India. Indian J Med Microbiol 1993;11:140-7.
6. Bharathi MJ, Ramakrishnan R, Vasu S, Meenakshi, Palaniappan R. Aetiological diagnosis of microbial keratitis in South India — A study of 1618 cases. Indian J Med Microbiol 2002;20:19-24.
7. Bharathi MJ, Ramakrishnan R, Vasu S, Meenakshi R, Palaniappan R. Epidemiological characteristics and laboratory diagnosis of fungal keratitis. A three-year study. Indian J Ophthalmol 2003;51:315-21.
8. Saha S, Sengupta J, Banerjee D, Saha S, Khetan A, Mandal SM. Systemic evaluation on antifungal susceptibility of keratitis associated fungal pathogens in eastern India. Med Microbiol Diagn 2014:3:1.
9. Saha S, Banerjee D, Khetan A, Sengupta J. Epidemiological profile of fungal keratitis in urban population of West Bengal, India. Oman J Ophthalmol 2009;2:114-8.


**How to cite this article:** Gouravalingappa L, Komaleeswari K, Sivaprakasam M. Mycotic keratitis in a tertiary care hospital in rural India. J Acad Clin Microbiol 2015;17:16-8.

**Source of Support:** Nil. **Conflict of Interest:** None declared.