

Research Article

A retrospective study of fungal corneal ulcer from the western part of Uttar Pradesh

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ABSTRACT

Background: Infectious keratitis is a major cause of avoidable blindness worldwide. Fungus is an important aetiological agent of infectious keratitis following corneal trauma with vegetative matter. This infection should be promptly treated to limit the morbidity and dangerous sequelae. The purpose of this study was to detect causative agents from corneal scrapings and to identify the predisposing factors of mycotic keratitis.

Methods: Corneal scrapings were taken in full aseptic precautions in total 112 suspected patients for fungal etiology and were subjected to direct examination by 10% KOH mount, gram stain and culture.

Results: A total 112 cases of suspected corneal ulcers were subjected to KOH mount to detect fungal elements in corneal scraping and culture to isolate aetiological agents. In our study 29 (25.8%) samples were found positive in KOH mount and fungus was isolated from the all KOH positive samples. Males were more commonly affected and were mostly in the age group of 30-50 years. *Fusarium* species was the most common fungus isolated followed by *Aspergillus* species.

Conclusion: Mycotic keratitis is a serious problem usually following corneal trauma, it requires rapid detection and identification of fungal agents for treatment to prevent disastrous consequences.

Keywords: *Aspergillus* species, Corneal scraping, *Fusarium* species, Infectious keratitis, Mycotic keratitis

INTRODUCTION

Corneal ulcer is the second most common cause of blindness after cataract in developing country. According to World Health Organization about 1.5 to 2.0 million new cases of monocular blindness in developing country every year is due to corneal ulceration.¹ Infectious keratitis is one of the major causes of avoidable blindness. Bacteria, viruses, fungi, and parasitic organisms may all infect the cornea. Fungus is an

important cause of infectious keratitis usually following trauma or treatment for a bacterial infection with steroids or antibiotics.² About 70 different fungi have been implicated as causing fungal keratitis, the two medically important groups responsible for corneal infection are yeast and filamentous fungi.³ Fungi such as candida and aspergillus keratitis are occurring in people who are immunocompromised because of underlying illness or medications. *Aspergillus* and *Fusarium* are responsible for one-third of all traumatic infectious keratitis. So, it

requires prompt diagnosis and effective treatment because devastating damage can result if treatment is delayed. The etiological and epidemiological pattern of keratitis shows significant variations with patient population, health of cornea, geographical region and also period of time.⁴ The purpose of this study was the comprehensive evaluation of fungal aetiological agents causing keratitis presenting at tertiary care hospital in western part of Uttar Pradesh.

METHODS

The study was conducted in department of microbiology in collaboration with ophthalmology department, Shri Ram Murti Smarak, institute of medical sciences, Bareilly, UP. A total 112 patients with suspected fungal ulcers visited the Out Patient Department (OPD) of ophthalmology were investigated to know the fungal aetiological agents in the department of microbiology. A detailed history was taken of all the patients about trauma and topical medications prior to ophthalmic examination. In all these patients, a detailed ocular examination was carried out and corneal scrapings were performed on all corneal ulcer patients from edge and base of the ulcer under full aseptic measures following the instillation of topical anaesthesia. The samples were directly inoculated on Blood Agar (BA), Chocolate Agar (CA) and Sabouraud's Dextrose Agar (SDA) in the form of C streak and sent to the microbiology department for further process.

Direct microscopic examination of the corneal scraping was done with 10% KOH mount. BA and CA plates were incubated at 37°C for 7 days, and discarded if no growth observed even after 7 days of incubation whereas SDA was incubated at 25°C and 37°C for 4 weeks. Culture was checked once in first week and twice a week for further 3 weeks. The culture was discarded, if no growth observed even at the end of 4 weeks of incubation. Any growth obtained was identified by the help of their unique morphological characters and biochemical properties.

RESULTS

This retrospective study was carried out from October 2009 to September 2013 to detect suspected fungal keratitis. A total 112 cases of suspected corneal ulcers were subjected to KOH mount to detect fungal elements in corneal scraping and culture to isolate aetiological agents. In our study 29 (25.8%) samples were found positive in KOH mount and fungus was isolated from the all KOH positive samples. No bacteria were isolated from bacterial culture. We classified the patients into three age groups, below 30 years, between 30-50 years and above 50 years. The most of the patients were between 30-50 years in both sexes. Overall, there was male predominance (21 male and 8 female) of the fungal keratitis patients (Figure 1). Most of the patients belonged to low-socioeconomic class (farmers and laborers). Corneal trauma with plant parts was identified

as a major predisposing factor in majority of the patients. There was no history of contact lens use in any patients. In this study all isolates were filamentous fungi, majority of them were hyaline hyphomycetes (14 *Fusarium* species & 8 *Aspergillus* species) followed by Phaeoid hyphomycetes (2 *Cladosporium* species, 2 *Curvularia* species, 2 *Alternaria* species, and 1 *Aureobasidium pullulans*) (Table 1). In our study no *Candida* species was isolated and *Fusarium* species was predominant (14 out of 29) fungal isolate.

Table 1: Fungal isolates from corneal scrapping.

Filamentous fungus	Number
<i>Fusarium</i> species	14
<i>Aspergillus fumigatus</i>	05
<i>Aspergillus flavus</i>	02
<i>Aspergillus niger</i>	01
<i>Cladosporium</i> species	02
<i>Curvularia</i> species	02
<i>Alternaria</i> species	02
<i>Aureobasidium pullulans</i>	01

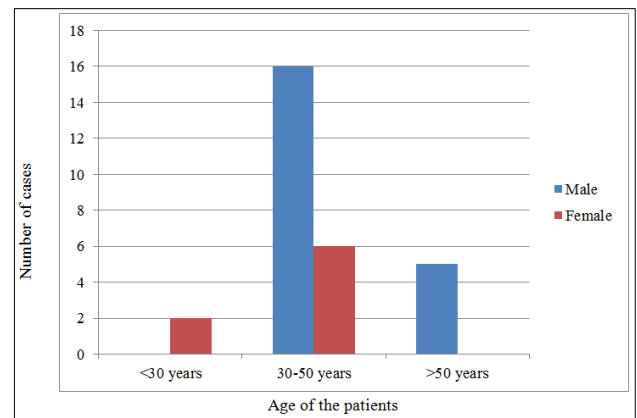


Figure 1: Age and sex distributions of the patients with fungal keratitis.

DISCUSSION

Infectious keratitis is an important cause of complete loss of vision in developing countries such as India. Among infectious aetiology, fungus is the main causative agent for corneal ulcers in the persons following vegetative corneal injury.⁵

In our study, fungi were detected in 25.9% (29 out of 112) corneal scrapping samples. Similar trend of isolation of fungi from corneal ulcer is observed by Bharathi MJ et al.⁴ The incidence of fungal isolation from corneal ulcer was significantly higher in male patients belonging to 30-50 age group. The trend of male preponderance is also observed in various studies conducted earlier.^{6,7}

The most of the male belonging to 30-50 age group involved in outdoor agriculture works are more prone to

corneal injury with vegetative matters may be the valid reason for male preponderance and 30-50 age group. Yeasts and moulds are two major fungal agents, which are responsible for the fungal keratitis. But in our study only filamentous fungi (hyphomycetes and phaeoid hyphomycetes) were isolated from the lesions, majority of them were hyaline hyphomycetes. In other studies also hyphomycetes was found predominant isolates followed by phaeoid hyphomycetes.⁶⁻⁸

In the present study, *Fusarium* species have been reported as the most common aetiological agents of corneal ulcer, which coincide with other studies.⁹⁻¹¹

Although *Aspergillus* species have been reported as the second most common aetiological agent of mycotic keratitis. But in most studies from the India, *Aspergillus* have been reported as the commonest cause of fungal keratitis.^{6,7} In the present study, the prevalence of dematiaceous fungi (*Curvularia*, *Alternaria*, *Cladosporium*, *Aureobasidium pullulans*) was found to be 24.13%. In the other studies dematiaceous fungi have been reported as the third most common agents of fungal keratitis.^{10,12}

In the present study, ocular trauma was found to be the most common risk factor particularly with vegetative matters. Apart from corneal trauma, uses of topical corticosteroids as well as overuse of antibiotics were other important risk factors for mycotic keratitis. Some patients had history of chronic systemic diseases, such as diabetes mellitus and tuberculosis which may contribute to mycotic corneal infection. Although use of contact lens is common risk factor of mycotic keratitis, but in this study no single patient had history of contact lens use.

CONCLUSION

Mycotic keratitis is still an important cause of ocular morbidity and serious sequelae among the persons residing in the rural areas and involved in outdoor field activities. Young male adults are more prone to corneal injury with vegetative matters because they work most of time in their fields to meet the demand of their family. Hence, corneal trauma requires prompt treatment on suspicion of mycotic keratitis after meticulous ophthalmic examination and detection of fungal elements by 10% KOH mount corneal scraping to limit the ocular morbidity and to prevent serious complications.

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