



## MYCOLOGICAL PROFILE OF CORNEAL ULCER AT TERTIARY CARE CENTRE IN CENTRAL INDIA

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**ABSTRACT** **Aim and objective:** To study the Mycological profile of corneal ulcer in patients attending tertiary care hospital, from January 2019 to September 2019, IGGMC, Nagpur

**Methods:** Corneal scrapings collected under slit-lamp examination with aseptic precautions were subjected to KOH mount, Gram stain, inoculated on Sabouraud dextrose agar and sent to Microbiology lab for further processing.

**Results:** Out of total of 56 patients with keratitis, 22 were positive for fungal growth. These included 43 (76.79%) men and 13(23.2%) women. Overall, 69.6% were rural inhabitants and 30.4% were urban. Most common affected age group was 31-40yrs (30.90%). Farmers were (50%) mostly affected occupational group. The commonest risk factor was trauma 68.17%. The incidence of fungal keratitis in our study was 39.3%. The most common fungal isolate was Aspergillus species (36.36%) and Candida (22.72%)

**Conclusion:** Mycotic keratitis is an avoidable disease. Early diagnosis and treatment can prevent the blindness.

**KEYWORDS :** Corneal ulcer, KOH mount, Sabouraud's Dextrose Agar

### INTRODUCTION

Corneal ulceration results in 1.5–2 million new cases of corneal blindness annually, posing a major public health problem according to the World Health Organization (WHO) reports<sup>(1)</sup> Microorganisms can penetrate through a breach in the epithelium either, by trauma involving plant or vegetable matter sustained in agricultural farms, due to surgery often leading to infectious corneal ulceration and loss of vision<sup>(2)</sup>. Keratitis is the most frequently encountered fungal infections, although the orbit, lids, lacrimal apparatus, sclera, conjunctiva and intraocular structures may also be involved.<sup>(3)</sup> Invasion of fungi into corneal layers followed by the subsequent tissue damage that follows is particularly devastating as it can disrupt the visual axis<sup>(4)</sup>

Various risk factors have been implicated for increased incidence of fungal keratitis including widespread use of antibiotics and steroids, use of contact lenses, and postoperative infections<sup>(5)</sup>. The knowledge of epidemiological profile of mycotic agent will help in presumptive treatment where cultures are negative or facilities do not exist.

### MATERIALS AND METHODS

Corneal scrapings from 56 patients with the clinical diagnosis of corneal ulcer with or without hypopyon attending ophthalmology department of IGGMC, Nagpur Hospital from January 2019 to September 2019 were included in the study.

Proper history was taken like age, sex, occupation, H/O trauma, surgery, antibiotic intake, steroid intake. Consent was taken for corneal scraping. Corneal scraping was taken in ophthalmology department under local anesthesia i.e. 4% paracaine eye drops without preservative.

Corneal scraping was done from the leading edge and the base of the ulcer by using kimura spatula or 15 no sterile Bard Parker Surgical Blade with the help of slit lamp under aseptic conditions. Samples were inoculated in SDA, Blood agar and slides were labeled and transported to microbiology laboratory, where SDA and Blood agar was incubated at 25°C and 37°C respectively in the incubator. Specimen was examined by Direct microscopic examination of the corneal scraping was performed with 10% potassium hydroxide (KOH) wet mount and by gram staining. The scraping were directly inoculated on two slants of Sabourand's dextrose agar incubated at 25°C & 37°C. Identification was done by standard microbiological methods

for fungal diagnosis. Yeast were further probed by gram staining, germ tube, HiCHROM agar inoculation and dalmau plating culture. Filamentous fungi were processed by Lactophenol cotton blue preparation (after tease mounting) and slide culture.<sup>(6)</sup>

### RESULTS

Out of 56 patients of keratitis, 22 were positive for fungal growth. This included 43 (76.79%) men, 13(23.21%) women and 69.64% were rural and 30.36% were urban inhabitants.

The commonest age group to be affected was 31-40yrs (46.51%) followed by 41-50 years. Peak incidence of corneal ulceration was seen during the monsoon season (June to September) 77.27%. This was followed by a high incidence during the harvest season (Jan. to March) 86.36%. In our study, out of the 22 positive cases, 11(50%) were farmers by occupation, 7 (31.82%) were working as daily labourers, 2 (9.09%) were working indoors (office/home maker), and 2 (9.09%) were drivers. In our study we observed that the most common risk factor associated with corneal ulcer was trauma 68.17% (15/22) of which vegetative trauma accounted for 36.36% (8/22) cases, followed by dust particles 13.63% (3/22). The incidence of fungal keratitis in our study was 39.3%.

Overall the most common isolate was Aspergillus species 8/22(36.39%) followed by Candida species 5/22 (22.72%) & then fusarium 3/22(13.64%). Among the Aspergillus species, Aspergillus fumigatus was the commonest 4(18.20%) and then followed by Aspergillus niger 3/22(13.64%) & Aspergillus flavus 1/22(4.55%).

The other fungi isolated were Mucor 2/22(9.09%), Acremoium 1(4.55%), Cladosporium 1(4.55%), Curvuleria 1 (4.55%) & Grapium 1(4.55%)

**Table 1: Age & Sex distribution of patients with corneal ulcer**

n= 56

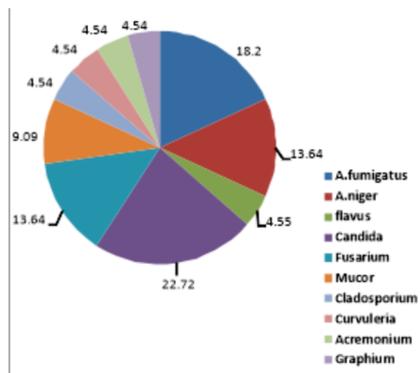
Age in years	Male (43) (76.79%)	Female (13) (23.21%)
0-10	0 (0%)	1 (7.7%)
11-20	1 (2.32%)	1 (7.7%)
21-30	5 (11.62%)	1 (7.7%)
31-40	20 (46.51%)	6 (46.2%)
41-50	13 (30.23%)	3 (23.0%)
51-60	3 (7.0%)	1 (7.7%)
61-70	1 (2.32%)	0 (0%)
<b>Total</b>	<b>43 (100%)</b>	<b>13 (100%)</b>

**Table 2: Demographic profile of the positive patients with Corneal ulcer**

(n=22)		
Region :-	Rural	69.64%
	Urban	30.36%
Month of Presentation :-	January-March	86.36%
	April-may	45.45%
	June-September	77.27%
	October- December	40.90%
Occupational Details :-		
Farmers	11	50%
Daily wages labourers	7	31.82%
Working indoors	2	9.09%
Drivers	2	9.09%
Total	22	100%

**Table 3: Predisposing factors associated with positive corneal ulcer patients.**

Predisposing factors	Number of cases	%(n=22)
Vegetative trauma	8	36.36%
Dust particles	3	13.63%
Others factors related with trauma	4	18.18%
Diabetes Mellitus	3	13.64%
Use of steroids	2	9.09%
Dust particles	1	4.55%
Contact lens usage	1	4.55%
Ocular abnormalities/ surgery	0	0
Total	22	100%

**Figure 4: Distribution of fungal species in positive cases of Ocular mycosis**

## DISCUSSION:-

Corneal blindness is a major public health problem worldwide & Fungi are an important cause of ocular infections leading to the visual impairment. (7,8) Mycotic keratitis may occur at any age, but highest incidence coincides with the period of maximal activity. (9) In the present study, maximum number of cases were of the age group 31-40 yr (46.51%), followed by 41-50 yrs (30.23%). This is the most common actively working age group which was similar to the study by **Tapan Gogoi et al** (10) where most of the cases (33%) of keratitis were in the age group 31- 40 years. **G. satpathy et al** (11) also reported maximum cases in the age group 31-40 yrs (30.8%) followed by 41-50 years (25.4%).

In our study gender distribution revealed that male preponderance (76.79%) is significantly high as compared to females (23.21%). Similar findings have been reported in **Parmjeet Kaur Gill et al** (12), in which keratomycosis was found to be more common in men (79.97%) than women. The reason for this is that men in this age group have greater exposure to the fungal agents due to maximum outdoor activity which predispose them to ocular trauma and other types of traumas with causative source contaminated with fungus (12)

We observed that fungal keratitis was more common in rural areas 39/56 (69.64%) than urban areas 17/56 (30.36%). **S Verma et al** , (13) also observed higher prevalence in rural areas (85%). This may be because mycotic keratitis is an important cause of ocular morbidity in rural population of developing countries where agriculture is the main occupation. **Vasudha C.L et al** (14)

In this study , farmers were ( 50%) most commonly affected followed by daily wages workers. This is attributed to ubiquitous fungal spores and presence of these on senescent plant material (**A Gupta et al**) (15).

Frequency of ocular trauma due to vegetative origin was predominant 8/22(36.36%) followed by Diabetes Mellitus (13.64%). **Srinivasan et al** (16) also showed farmers to be the most affected cases. In some other study done by **Mohod P.N et al**, also Vegetative trauma was the most common predisposing factor for the development of corneal ulcer representing 49% cases (17).

This may be due to an Injury with vegetative origin like sugarcane leaf which reaches the average level of the human eye & fungi are known soil saprophytes and plant pathogens. Furthermore Indian climate favors the growth of these fungi .This is in accordance with study done by **Kanishtha Sharma et al**, in which Ocular trauma due to Vegetative origin was the the predominant cause (81.48%) followed by Diabetes Mellitus (50%) (18). In contrast, A study from Philadelphia, showed chronic ocular surface disease, contact lens usage and use of topical corticosteroids as commonest risk factors. (19)

The incidence of fungal keratitis was higher during the paddy harvest season (Jan. to March)- 86.36% and the monsoon season (June – September) 77.27%, when agricultural activity was greater. The peak incidence correlates with windy and dry weather during the month of June through September and during hot, humid, windy climate which makes fungal keratitis more frequent in tropical zones (20). **Our study correlates with Bharathi M. J et al** (21).

The incidence of fungal keratitis in our study was 39.3% which is similar to study done by **Bharathi M J et al** (21). The incidence of fungal keratitis in this study was 34.4%. Incidence reported in other regions of India are 7.3% in North India (22), 32% in East India (23), 38.9% in West India (24) and 39.8% in South India. (25). **Mohod P.N et al** reported a very high incidence of 59.09% (17). This regional variation could be because fungal keratitis is expected to be more common in the tropical and subtropical regions than in the temperate regions.

Overall the most common isolate in this study was Aspergillus species 8/22(36.39%) followed by Candida 5/22 ( 22.72%) & fusarium 3/22(13.64%). **Parmjeet Kaur Gil et al** , also got most common fungal isolates as Aspergillus species (50%), Candida (20%) and Fusarium (15%) (12). **Rumpa Saha et al** (9) got similar result. As has been reported worldwide as well as from India, Aspergillus species is the most common isolate in fungal keratitis (26).

**In contrast to our Study**, Mohod et al (17) and Srinivasan et al (16) (31) showed Fusarium to be the commonest isolate followed by Aspergillus spp. The other fungi isolated in this study were Mucor 2/22(9.09%), Acremonium 1(4.55%),

cladosporium 1(4.55%), Curvularia 1 (4.55%) & graphium 1(4.55%). **Bharathi M J et al** reported other fungal isolates as Mucor 0.54% , Cladosporium 6.64%, Curvularia 2.64% (21)

## CONCLUSION-

To conclude, Mycotic keratitis is an avoidable vision-threatening disease that still represents a considerable proportion of daily cases which leads to severe ocular morbidity .

Though bacteria, fungi and parasites are responsible for keratitis, fungal agents deserve special mention due to their opportunistic behavior. Early, meticulous examination of corneal scrapings by microbiological diagnostic methods and timely institution of antifungal therapy may limit ocular morbidity and its disastrous sequelae. Proper understanding of microbiological and clinical characteristics of keratomycosis will decrease the indiscriminate use of drugs.

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