

ORIGINAL ARTICLE

EPIDEMIOLOGY, PREDISPOSING FACTORS AND ETIOLOGY OF FUNGAL KERATITIS IN A TERTIARY EYE CARE HOSPITAL IN WESTERN INDIARaval Payal¹, Patel Purav¹, Bhatt Sima².

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ABSTRACT

Introduction: Mycotic keratitis is an important ophthalmologic problem especially in developing countries. Fungal infection is a fatal condition which needs early diagnosis and treatment to save the patient's eye

Objective: The purpose of this study was to study etiology, epidemiological characteristics and common predisposing factors responsible for ocular infection.

Materials and Methods: Corneal scrapings from 100 patients of corneal ulcer with suspected fungal aetiology were subjected to direct examination by 10 per cent KOH mount, Gram stain and culture. The laboratory results along with clinical and epidemiological data were examined and analyzed.

Result: Of the 100 patients of investigated, in 24 cases fungal aetiology was identified. It was seen that ocular trauma was the most common predisposing factor which was correlating with the occupation. *Aspergillus* spp was the most common fungus isolated in 11 cases, followed by *Fusarium* spp. (5) and *Curcularia* spp. (3). Yeasts were also isolated 3 cases.

Conclusion: In conclusion, the major element in the diagnosis of mycotic keratitis is the clinical suspicion by the ophthalmologists and laboratory confirmation of the fungus.

Keywords: Fungal infection, corneal ulcer, ocular infection

INTRODUCTION

Mycotic keratitis is an important ophthalmologic problem especially in developing countries. It is responsible for significant prevalence of morbidity and blindness worldwide [1]. Different types of fungi that are one of the important etiological agents also affect cornea and other ocular structures. Fungal infection is a fatal condition which needs early diagnosis and treatment to save the patient's eye. The etiological and epidemiological patterns of ocular infection have been found to vary with the patient population, geographic location and climate, and also tends to vary over time [2].

OBJECTIVE

The purpose of this study was to study etiology, epidemiological characteristics and common predisposing factors responsible for ocular infection.

MATERIAL AND METHODS

All patients attending eye care hospital during the year 2011 were studied after clinical diagnosis of infective keratitis was done. Ulcer was defined as a loss of the corneal epithelium with underlying stromal infiltration and suppuration associated with signs of inflammation with or without hypopyon [3]. Brief clinical history and demographic data including age, sex, residence, occupation, etc was collected and analyzed in proper manner. Corneal scraping for analysis was carried out directly from the base and margin of ulcers aseptically using Kimura's spatula or scalpel blade. A local anaesthetic without preservative was used. Direct microscopy using 10% KOH and Gram was done. For fungal cultures samples were seeded on the two sets of Sabouraud's dextrose agar (SDA) with antibiotics and without cycloheximide and maintained at 25 and 37°C separately over a period of two weeks.

Fungi were identified by their colony characteristics on SDA and by their microscopic appearance in lacto phenol cotton blue [4].

RESULTS

Out of the 100 cases of corneal ulcer investigated, in 24 (24%) fungal aetiology was identified. Patients’ detailed clinical history and demographic data was collected during this study for analysis. Out of total 100 patients investigated, 61 were male and 39 were female patients. The most common age group affected was between 21 to 40 year (58) followed by 41-60 years (36). Patients’ clinical history and demographic data was collected during this study for analysis. Table 1 shows demographic data analyzed in this study.

Table1: Demographic data of patients included this study

Demographics	Indicator	Frequency
Age (In years)	<20	3
	21 – 40	58
	41 – 60	36
	> 60	3
Sex	Male	61
	Female	39
Residence	Rural	41
	Urban	59
Occupation	Farmer	19
	Carpenter	11
	Laborer	14
	Housewife	19
	Service	9
	Worker	11
	Driver	4
	Business	6
	Student	5
	Unemployed	2
Literacy	Literate	79
	Illiterate	21

Out of 100 samples investigated, 39 patients had history of injury either by vegetative matter, wooden, dust, stone, animal tail, chemical or thorn. 17 patients had pre existing ocular disease like conjunctivitis, blephritis or dacryocystitis. Other clinical history was also noted for all patients. Out of 100 samples collected, 24 cases fungi were isolated in culture. Microscopic finding were correlated with culture results. Among 24 positive culture samples 3 were yeast like fungi and 21 were filamentous fungi. Out 21 filamentous fungi, 15 had positive microscopic finding while out 3 yeast like fungi, 1

had positive microscopy. The most common predisposing factor among culture positive isolates was ocular injury due to vegetative or any matter (11/25) followed by preexisting ocular disease (3/25). No predisposing factor was noted in 10 samples.

Table 2: Predisposing factors analyzed in this study

Predisposing factors	Frequency
Ocular trauma (n=39)	
Vegetative injury	14
Injury by wooden object	8
Injury by unknown foreign body	6
Stone injury	2
Thorn Injury	1
Injury by animal tail	2
Chemical Injury	1
Dust	5
Pre existing Ocular diseases (n=17)	
Conjunctivitis	11
Blepharitis	4
Dacryocystitis	2
Contact lens wearing	5
Diabetes	5
Corticosteroid therapy	3
Post operative	2
Not identified	29
Total	100

Table 3: Evaluation of microscopy against culture results

Organisms	Positive in Microscopy	Positive Culture
Filamentous fungi	15	21
Yeast like fungi	1	3

Table 4: Details of Culture positive isolates

Fungal isolates	Frequency (n=24)
Aspergillus spp.	
Aspergillus fumigatus	6
Aspergillus flavus	5
Aspergillus Niger	1
Fusarium spp.	5
Candida spp.	
Candida albicans	2
Candida tropicalis	1
Curvularia spp.	3
Alternaria spp	1

Out of 24 fungal isolates, 21 were Filamentous fungi and remaining 3 were Yeast like fungi. Most common causative fungal organism among these isolates was *Aspergillus* spp. (*Aspergillus fumigatus*-6, *Aspergillus flavus*-5 and *Aspergillus Niger*-1) which was isolated from total 12 clinical samples. After that another causative fungal organisms were *Fusarium* spp. (5), *Candida* spp. (3) *Curvularia* spp. (3) and *Alternaria* spp. (1). The details of positive microbial etiology are given in table 4.

DISCUSSION

Corneal blindness is a major public health problem worldwide and infectious keratitis is one of the predominant causes. The incidence of ocular fungal infections has increased in the last few years due to the improvement in microbiologic diagnostic techniques and because of introduction of new therapeutic measures such as widespread use of broad-spectrum antibiotics, immunosuppressive drugs and corticosteroids.^[5] Ocular infection occurred most frequently in the middle age. Male: female ratio was 1.56:1. Mean age of the patients in this study was 39.34 years. Highest number of male patients were farmers or related to agriculture work (19) followed by laborer (14) and carpenter (11) and worker (11). Among female patients, most of them were housewives (27). Literacy rate among the patients enrolled in this study was 79%. Ocular infection was higher in the farmers or agriculture workers in the previous study^[6,8] which is comparable to our study. This study shows that there is significant association between occupation and infectious keratitis. Among the predisposing factors, trauma was encountered in 39 of the patients. Among all 24 fungal isolates, 11 had history of injury which correlating with previous study.^[7,8] Injury with wooden objects and vegetable matter well coincides with the occupation of the population under study which was similar to another studies which found ulcerative keratitis high in farmers^[9] & laborers.^[10] Fungal growth was seen in 24 out of 100 samples evaluated. Prevalence rate of fungal infection was 22.25% in New Delhi^[11], 10.3% in South India^[12], 36% in Bangladesh^[7] and 37% in Nepal^[6]. *Aspergillus* spp. was the predominant species in this study. Prevalence of *Aspergillus* from total fungal isolates was 40% in a study from Kashmir^[13], 40.42% in Bangladesh^[7], 56.4% and 51.94% in two different studies in New Delhi^[14, 15] and in 59.8% of total fungal isolates from Eastern India^[9]. Out of total *Aspergillus* isolates, *Aspergillus fumigatus* and *Aspergillus flavus* were most common pathogens which is similar to other pre-

vious studies.^[7, 15] *Fusarium* accounted for 20% of total fungal isolates which was similar to a previous study of Dunlop et al. in which *Fusarium* was seen in 19.14%.^[7]

CONCLUSION

In conclusion, the major element in the diagnosis of mycotic keratitis is the clinical suspicion by the ophthalmologists and laboratory confirmation of the fungus before prescribing corticosteroids and antibacterial antibiotics. Microscopic evaluation of corneal smear can provide insight into the identity of the pathogens. Persistent efforts should be put for continuous surveillance and epidemiological characterization which are imperative to treat and prevent morbidity and blindness of population at risk in India.

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