

To Determine the Clinical and Mycological Profile of Fungal Keratitis

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Abstract

Aim: To determine the clinical and mycological profile of fungal keratitis.

Material and methods: Each subject having infected corneal ulcers who reported in the Eye OPD got involved in the study, as well as every subject gave written informed consent. Corneal scrapings had been gathered using slit lamp magnification, then stained with gramme stain as well as ten percent KOH mount prior to being sent to Microbiology laboratory for culture as well as sensitivity testing. Fungal cultures were inoculated onto SDA, incubated at twenty seven degree celsius, checked daily, and removed after two weeks in case no growth was evident.

Results: This research included 80 individuals having a clinical diagnosis of infective corneal ulcer with or without hypopyon. The majority of the cases (50.5%) were determined to be of fungal origin. The majority of the 50 patients with fungal corneal ulcers were found to be between the ages of 25 -35, and to be from rural areas. Males made up slightly more than half of all patients (54%), and most patients (60% overall) went to the hospital between 8 - 21 days after their symptoms first appeared. The most prevalent risk factor for fungal corneal ulcers was trauma with vegetative matter (40%). According to microbiological analysis, Aspergillus was the most prevalent fungus species identified (46%).

Conclusion: It was observed that Aspergillus and Fusarium were the most common fungi isolated. Our hope is that by including microbiological investigation of specimens and making efficient use of available resources, we can better diagnose and treat these illnesses.

1. Introduction

Due to corneal scarring, fungal keratitis, which accounts for forty percent to fifty percent of all microbial keratitis instances worldwide, is a significant cause of ocular morbidity.¹ Environment as well as socioeconomic status may also contribute to the explanation of why this condition is quite prevalent in underdeveloped

countries.^{1 2} Fungi from over a hundred distinct species have been linked to the development of fungal keratitis.³ Analysis has shown that the predominance of this condition as well as the varieties of fungi recognised are distinct throughout warmer, southern environments as opposed to those in the north. Fusarium, Candida, as well as Aspergillus are the 3 fungi frequently

secluded in the United States. We found that 6.7 percent of all instances of infectious keratitis at the University of Pittsburgh Eye Center throughout the course of our fourteen-year analysis were caused by FK. 4

Atopic disorder, topical steroid use, ocular surface disorder, as well as trauma constitute just a handful of the several factors that might trigger this condition.^{5 7} Filamentous fungal infestations are more common across underdeveloped countries and are associated to agricultural activities as well as direct eye encounter with biowaste. The extensive utilization of CLs during the past 5 years has led to an increase in FK cases, rendering contact lens utilization a significant cause of the epidemic across developed countries. Delays in the detection of FK have been associated with issues involving prolonged isolation as well as negative cultures.^{5 8} Isolation on Sabouraud dextrose agar as well as blood agar, which is extremely specific, however, not sensitive, is the preferred method for diagnosis. The microscopic examination of corneal scrapings comes next.⁵

The epidemiological picture as well as spectrum of causative factors for infectious corneal ulcers vary greatly from nation to nation as well as from place to place inside the single nation. The "regional" causative agents in a particular location must be determined in attempt to create an entire strategy for the identification as well as management of corneal ulcers.⁹ In India, minimal ocular injuries sustained in agricultural fields can end in infected corneal ulcers as well as blindness.

Fungus-related ocular infections can be brought about by a number of elements, such as injury to the eye's tissues or therapeutic interventions using antibiotics or corticosteroids. These conditions are primarily prevalent in tropical areas.¹⁰

2. Material and Methods

The Department of Ophthalmology performed the research, which was designed as a prospective study. Each subject having infected corneal ulcers who reported in the Eye OPD got involved in the study, as well as every subject gave written informed consent. Mooren's ulcers, marginal ulcers, interstitial keratitis, sterile neurotrophic ulcers, and ulcers linked with autoimmune diseases were all eliminated from the study. Patient data was collected using a pre-designed Performa that included clinical information such as duration of symptoms, past therapy, underlying ocular diseases, and related risk factors.

Patients were subjected to a comprehensive ophthalmological examination, including visual acuity and slit lamp examination. Corneal scrapings had been gathered using slit lamp magnification, then stained with gramme stain as well as ten percent KOH mount prior to being sent to Microbiology laboratory for culture as well as sensitivity testing. Fungal cultures were inoculated onto SDA, incubated at twenty seven degree celsius, checked daily, and removed after two weeks in case no growth was evident. Trichiasis/entropion, Blepharitis, Bell's palsy, lagophthalmos, chronic dacryocystitis, dry eyes, bullous keratopathy, spheroidal degeneration of the cornea, any corneal surgery, contact

lens usage, or ocular leprosy had all been reported. The utilisation of topical agents, like corticosteroids, had also been observed.

3. Results

This research included 80 individuals having a clinical diagnosis of infective corneal ulcer with or without hypopyon. The majority of the cases (50.5%) were determined to be of fungal origin. (Table.1)

Table 1: Microbiological profile of infective corneal ulcers

Type of micro-organism	No. of cases	%
Definitive fungal	50	62.5
Definitive bacterial	25	31.25
Mixed	3	3.75
Inconclusive	2	2.5
Total	80	100

The majority of the 50 patients with fungal corneal ulcers were found to be between the ages of 25 -35, and to be from rural areas. Males made up slightly more than

half of all patients (54%), and most patients (60% overall) went to the hospital between 8 - 21 days after their symptoms first appeared. (Table. 2)

Table 2: Demographic profile of study participants with fungal corneal ulcer

Demographic profile of fungal corneal ulcer	Number=50	Percentage
Gender		
Male	27	54
Female	23	46
Age		
Below 25	2	4
25-35	24	48
35-45	16	32
45-55	3	6
Above 55	5	10
Area		
Rural	22	44
Urban	28	56
Time of presentation		
7 days	3	6
8-21 days	30	60
above 21 days	17	34

The most prevalent risk factor for fungal corneal ulcers was trauma with vegetative matter (40%). Animal (14%), wood (10%), and other agents are also important. Five

patients, or 10%, had ocular problems that put them at risk for developing a fungal corneal ulcer. (Table.3)

Table 3: Predisposing factors

Predisposing factors	Number=50	Percentage
Trauma		
Vegetative matter	20	40
Animal	7	14
Stone	4	8
Wood	5	10
Miscellaneous	2	4
Coexisting ocular disorder	5	10
Coexisting systemic disease	1	2
Steroid use	2	4
No specific history	4	8

According to microbiological analysis, Aspergillus was the most prevalent fungus species identified (46%). The most prevalent subspecies detected were Aspergillus flavus, Aspergillus fumigatus,

Aspergillus niger, and Aspergillus.spp. Fusarium was detected in 17 (34%) of the fungal corneal ulcer specimens, whereas no growth was observed in 2 (4%). (Table.4)

Table 4: Isolation of Fungi

Fungal Isolates	Number	Percentage
Aspergillus	23	46
A.Fumigatus	6	12
A.Flavus	10	20
A.Niger	4	8
A.Spp	3	6
Fusarium	17	34
Candida	1	2
Penicillum	3	6
Mixed	4	8
No growth	2	4
Total	50	100

4. Discussion

The major etiology for corneal disability, a significant worldwide health problem, is infectious keratitis. The widespread usage of corticosteroids, immunosuppressive drugs, broad-spectrum antibiotics, as well as other treatments, and the development of microbiologic diagnostic techniques in previous years, have all been associated with rises in ophthalmic fungal diseases. It's probable that different countries have different rates of mycotic keratitis. It varies between 6.4 percent and 46.8 percent in various regions of India. This study had an influence on 4 in 10 adults within the age range of twenty five and thirty five years, showing a significant societal & economical influence.^{11 12} Western Orissa as well as southern India's studies have produced similar results.

Since they are more inclined to work in agriculture, like cutting grass from forests for animals, people experiencing fungal corneal ulcers are most likely to reside in metropolitan regions. Working in agriculture was a common cause of mycotic keratitis and the subsequent eye injury.¹³ Other investigations confirmed this finding, attributing between fifty four and seventy percent of corneal ulcers to agricultural and manual workers.^{14 15} Ophthalmic trauma, most frequently from vegetable debris, was the leading source of fungal ulcers, accompanied by animal, wood, as well as stone trauma. Only thirteen percent of sufferers in southern India obtained medical care within eight to twenty one days compared to sixty percent of participants in this study. This is greater than statistics published for southern India by Leck et al.⁹ as well as Bharathi et al.^{14 13}

however on pace with analyses performed by Srinivasan et al.¹¹ as well as Basak SK et al.¹⁴. *Aspergillus* spp. were the most commonly found fungi pathogens throughout this collection. Amongst fifty fungal samples, forty six percent belonged to the *Aspergillus* genus, thirty four percent to *Fusarium* spp., while six percent to *Penicillium* spp. We discovered a decreased incidence of *Candida* spp. in our study when compared to earlier studies. The Indian metropolis of Mumbai & Chennai, as well as various north & southern territories, and Nepal, as well as Bangladesh, had a particularly high prevalence of the *Aspergillus* genus. In sixteen to eighteen studies carried out in southern India, *Fusarium* spp. were discovered to be significantly common than *Aspergillus* spp.

It is observed that *Fusarium* spp. is the chief fungal pathogen across the regions of Florida, Paraguay, Nigeria, Tanzania, Hong Kong, as well as Singapore.¹⁹ Differences in climate as well as the environment may be reason for such episodes.

5. Conclusion

It was observed that *Aspergillus* and *Fusarium* were the most common fungi isolated. Our hope is that by including microbiological investigation of specimens and making efficient use of available resources, we can better diagnose and treat these illnesses.

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