

Clinical profile of patients of fungal keratitis presenting to the tertiary health care centre

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Abstract

Purpose - To study the clinical profile of patients of fungal keratitis presenting to the tertiary health care centre.

Methods- This was a prospective observational study that involved 100 eyes of 50 patients with fungal keratitis complaining of foreign body sensation, pain, blurring of vision, redness, itching, watering, photophobia. Diagnostic tests were done in all the patients.

Results- There were 34 males and 16 females and the age group taken was 30 to 75 years.

14 patients belonged to the age group of 30 to 45 years, out of which 10 were males and 4 were females. 28 patients belonged to age group of 46 to 60 years, out of which 22 were males and 6 were females. 8 patients belonged to the age group of 61 to 75 years, out of which 6 were males and 2 were females. Most common presentation in fungal keratitis patients is foreign body sensation in 72% patients followed by blurring of vision in 66% patients, pain in 55% patients, redness in 48% patients, itching in 44% patients, watering in 38% patients and photophobia in 32% patients. Majority of patients belong to low socioeconomic class. Most of the patients presented in monsoon season from July to September. The most common risk factor was trauma with vegetative matter followed by ocular surgery, contact lens users, topical steroid users and immunocompromised states like diabetes mellitus. Predominant fungal isolate was *Aspergillus* spp. followed by *Fusarium*, *Candida*, and *Curvularia* spp.

Conclusion - Fungal keratitis is a common form of ocular disease and tends to occur more commonly in males of 46 to 60 years age group that is males working in farms. Most common presentation of fungal keratitis is foreign body sensation and blurring of vision followed by pain, redness, itching, watering and photophobia and signs include dry feathery corneal ulcer, hypopyon, satellite lesions, sloughing ulcer and in some cases impending perforation. Most common organism isolated was *Aspergillus* followed by *Fusarium* and *Candida*.

Keywords: fungal keratitis, feathery ulcer, hypopyon, *Aspergillus*

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I. Introduction

Infective keratitis is the inflammation of cornea due to infection. It can be caused by bacteria, viruses, fungi or parasites. Compared to other infective corneal ulcers, fungal corneal ulcers are most challenging to diagnose, treat and are more likely to get perforated and lead to irreversible changes in the cornea. Invasion of fungi into corneal layers followed by the subsequent tissue damage that follows is particularly devastating as it can disrupt the visual axis [1]. Fungal keratitis is a suppurative lesion with a dry, raised ulcer with crenate, speculated or pseudohyphate borders, satellite lesions and hypopyon; associated with failure to respond to antibacterial treatment [2].

Risk factors associated with fungal keratitis are Male, Trauma, Contact lens use, Topical corticosteroid use, Diabetes mellitus, and Low socioeconomic status. Vegetative ocular trauma is undoubtedly the most common risk factor for fungal keratitis. Ocular trauma is essential to breach an intact corneal epithelium for introduction of microbial organism. It is extremely rare to encounter a case of fungal keratitis in an otherwise healthy eye, without any associated risk factors. This is because intact cornea is fairly resistant to microbial infections. Trauma helps to introduce and inoculate fungi directly into the cornea. Males are particularly more prone to fungal keratitis, as outdoor activities and farming practices predispose to vegetative trauma. Factors associated with contact lens use and chances of fungal keratitis include nocturnal use during sleep, male gender, smoking history and socioeconomic status, relating to unhygienic contact lens behavior [3]. Microbes have higher chance of adherence to cornea with contact lens. Hypoxia and hypercapnia are pathogenic changes associated with contact lens induced microbial keratitis [4].

Antibiotics and corticosteroids use also render the eye susceptible to infections. Excessive steroid use leads to decrease in host defense mechanism and creates a favorable environment for fungal inoculation.

Systemic disease like diabetes mellitus has emerged as a major risk factor in the recent years. Host defense is severely impaired in diabetes and high glucose provides a suitable growth media for microbial organism.

Both filamentous fungi and yeasts are implicated as causative agents of fungal keratitis. *Aspergillus* and *Fusarium* are two major cause of fungal keratitis. *Aspergillus* associated with higher incidences of complications but shows better response with antifungal medications. Fungal keratitis due to *Candida* species has the worst clinical outcome [5]. *Fusarium* is mainly associated with contact lens induced keratitis.

Keratitis is best examined under slit lamp microscopy. Slit lamp microscopy will show dry, thick and raised corneal surface. Majority of cases will have stromal infiltrates with feathery margins and endothelial plaque. Satellite lesion is typically seen in fungal keratitis . Hypopyon is detected in most of the cases, which can lead to ocular hypertension . The identified risk factor for hypopyon includes infection with *Fusarium* and *Aspergillus*, in particular; and long duration of symptoms with larger lesion size [6]. It is not uncommon to see deep stromal infiltration, corneal abscess and dissemination of infection.

Fungal keratitis with hypopyon



Corneal ulcer showing feathery margin and satellite lesions



Fungal keratitis with conjunctival congestion and hypopyon



II. Method And Material

This was a prospective observational study that involved 100 eyes of 50 patients with fungal keratitis complaining of foreign body sensation ,blurring of vision, pain, redness, itching, watering and photophobia. Patients were recruited from the OPD of MLB MEDICAL college, Jhansi ,Uttar Pradesh and were followed from 1st July 2019- 1st January 2020 . It was performed under the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

Inclusion criteria

1. All patients between the age group 30 to 75 years who presented to the OPD of MLB medical College Jhansi with the complaint of foreign body sensation ,blurring of vision, pain, redness, itching, watering and photophobia and who were found to have positive results of any of the fungal keratitis diagnostic tests like

fluorescein staining ,slit lamp examination, KOH smear , sabouraud dextrose agar culture.

Exclusion criteria

1. Patients outside the age group of 30 to 75 years.
2. Patients with any other corneal pathology.
3. Patients with other conjunctival diseases.
4. Patients with any other ocular pathology.
5. Mentally or physically unfit patients.

All patients were subjected to a detailed history taking, complete ophthalmic examination in diffuse and focal light and numerous fungal keratitis diagnostic tests.

III. Results

A total of 100 eyes of 50 patients were studied. We included only eyes with a recent complaint of foreign body sensation ,blurring of vision, pain, redness, itching, watering and photophobia. There were 34 males and 16 females and 60% of the studied eyes were right eyes.

All eyes showed positive results to one or more fungal keratitis diagnostic tests.

Table1: Age distribution in dry eye population

| Age group | no. of patients | |
|-----------|-----------------|----|
| 1 | 30 to 45 years | 14 |
| 2 | 46 to 60 years | 28 |
| 3 | 61 to 75 years | 08 |

Table2: Gender distribution in fungal keratitis patients

| Gender | no. of patients | |
|--------|-----------------|----|
| 1 | Male | 34 |
| 2 | Female | 16 |

Table3: Fungal species isolated in patients of fungal keratitis

| Organism | no. of patients | |
|----------|-----------------|----|
| 1 | Aspergillus | 23 |
| 2 | Fusarium | 15 |
| 3 | Curvularia | 05 |
| 4 | Candida | 04 |
| 5 | Others | 03 |

Table4: Ocular symptoms in patients of dry eye

| Symptoms | % of patients | |
|----------|------------------------|-----|
| 1 | Foreign body sensation | 72% |
| 2 | Blurring of vision | 66% |
| 3 | Pain | 55% |
| 4 | Redness | 48% |
| 5 | Itching | 44% |

| | | |
|---|-------------|-----|
| 6 | Watering | 38% |
| 7 | Photophobia | 32% |

IV. Discussion

Gonzales *et al.* [7] and Srinivasan *et al.* [8] reported the ratio of male to female with corneal ulcer as 1.6 to 1. *Fusarium* and *Aspergillus* keratitis were majorly (94%) confirmed in middle aged (21-70 years) individuals with a focused predominance in 41-50 years (28.8%). Fungal keratitis carries a significant risk in developing countries and is one of the leading causes of vision loss [9]. Vegetative trauma in agriculturist and sand particles are the most common causes of mycotic keratitis in developing countries [10]. Middle age working men are more susceptible and constitutes majority of cases. Whereas, contact lens (CL) use is the leading cause in developed countries. In the present study, male patients were more affected than female patients which is in agreement with the study done by Tityal *et al.*, (2006). This pattern of gender variability maybe attributed to the increased outdoor activity of men especially in the working age group and also as per the prevailing socio-cultural structure, predominantly males go for the outdoor work and the same applies for the farming. In contrast, in the study done in China, women were more affected and most of them were over the age of 60 (Cao *et al.*, 2014). This could be due to higher employability of women particularly in the agricultural sector in China. Sethi *et al.*, (2010), Keshav *et al.*, (2009), Amrutha and Venkatesha (2014) were in labourers/farmers contributed ranging from 54-70% and housewives/homemakers 11-13%.

In this study, the commonest age group affected were 46–60 years , followed by 30-45 and 46 – 60 which is in agreement with the results of (Cameron *et al.*, 2006) [11] in Sydney and (Das and Konar, 2013) [12] in Kolkata, and Laltanpuia Chhangte *et al.*, in Uttarakhand (www.ijsrp.org). The most common age group who are affected (41-60 years) impact the socio-economic conditions as they usually support families financially. Similar age group was also most commonly affected in south India and western Orissa (Srinivasan *et al.*, 1997; Samir Mahapatra *et al.*, 2009) [13]. While in the eastern study and Bangladesh study, the commonest age group was 21-40 years (Sharmeen Ahmed *et al.*, 2010; Basak *et al.*, 2005). In the present study, the most common risk factor was trauma to the eye and the trauma in most cases was due to vegetative matter, followed by the accidental piercing of eye with animal hair , foreign body, sand/stone related to material at construction sites and sharp wooden structures , which is similar to study by (Sharma and Mehta, 2014) and (Katara *et al.*, 2013) In our study most commonly isolated fungal pathogen was *Aspergillus* spp. , followed by *Fusarium* spp both of which together constituted majority of patients. This is in accordance with the study by Rishi Mehta *et al.*, 29 In similar studies done at Mumbai, parts of South India, North India, Nepal and Bangladesh. (Kumar *et al.*, 2011; Bharathi *et al.*, 2003; Williams *et al.*, 1987; Despande and Koppikar, 1999; Garg *et al.*, 2000; Sunbaram *et al.*, 1989; Venugopal *et al.*, 1989) [14,15,16] It was found that *Aspergillus* species was predominant. While other studies in South India reported *Fusarium* spp to be more common than *Aspergillus* spp (Leck *et al.*, 2002; Sharma and Athmanathan, 2002; Sunbaram *et al.*, 1989) *Fusarium* spp have also been found to be the principal fungal pathogen in Florida, Paraguay, Nigeria, Tanzania, Hong Kong and Singapore. (Dunlop *et al.*, 1994; Liesegang and Forstor, 1980; Tanure *et al.*, 2000) This phenomenon may be explained by differences in climate and the natural environment.

V. Conclusion

Fungal keratitis is a common disease and tends to occur more in males of 46 to 60 years age group of low socio economic status working in agriculture farms. Most of cases showed history of ocular trauma by vegetative matter . Our study spans over a period of 6 months and is prospective in nature focusing on age and gender distribution and clinical profile of fungal keratitis patients. Most predominant symptom of fungal keratitis is foreign body sensation followed by blurring of vision , pain , redness , itching , watering and photophobia. Most common fungal species isolated was *aspergillus* followed by *fusarium* , *curvularia* and *candida*.

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