



A CLINICAL STUDY OF FUNGAL CORNEAL ULCER INPATIENTS ATTENDING A TERTIARY CARE HOSPITAL

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ABSTRACT

The aim is to study the clinical-microbiological correlations and outcomes of fungal corneal ulcer cases.

1. Observational study.

2. Place of study - Department of Ophthalmology, Rangaraya Medical College, Kakinada.

3. Number of subjects 100 patients clinically diagnosed fungal corneal ulcer.

Study tools –slit lamp biomicroscopy, zeiss operative Microscope, proparacaine eyedrops, fluorescein strips, 15 B.P sterile blades, glass slides, sabouraud's dextrose agar, blood agar, chocolate agar, brain heart infusion broth, 10% KOH, gram stain, giemsa stain, lactophenol cotton blue, compound microscope.

Results: Among the 100 corneal ulcer patients 87 healed with corneal opacity, 12 had corneal perforation, one had non healing corneal ulcer.

Conclusion: Fungal corneal ulcer continues to be an important corneal morbidity.

KEYWORDS : Fungal corneal ulcer, perforation, corneal blindness.

INTRODUCTION

Corneal ulcers are a significant public health problem in developing countries, causing prolonged ocular morbidity and visual impairment. Corneal blindness is responsible for 1.5 to 2 million new cases of monocular blindness every year. Ocular trauma and corneal ulceration are essential contributors to corneal blindness. In a vast agricultural country like India, mainly where primary health care and referral systems are weak, minor eye injuries sustained in agriculture farm often lead to corneal ulceration of fungal aetiology and loss of vision.

Aim of study

The aim of study is the clinical and microbiological correlations and outcomes fungal corneal ulcer Patients

MATERIALS AND METHODS

PATIENTS AND METHODS

1. Study design - Prospective Observational study.
2. Place of study - Department of Ophthalmology, Rangaraya Medical College, Kakinada.
3. Number of subjects - 100
4. Selection of subjects - Patients with clinically diagnosed fungal corneal ulcer
5. Attending OPD in the Department of Ophthalmology, GGH, Kakinada.
6. Study duration - December 2018 to August 2020.
7. Study tools - Slit lamp Biomicroscopy, Zeiss operative Microscope, Proparacaine eye Drops, fluorescein strips, 15 B.P sterile blades, glass slides, Sabouraud's dextrose.

INCLUSION CRITERIA

- All Males and females above 16 years of age with clinically diagnosed fungal corneal ulcer, who were willing to give informed consent and follow up were included in this study.

EXCLUSION CRITERIA:

- Patients who were noncompliant.
- Patients who were less than 16 years of age during the study period.
- Patients who could not give informed consent.

- Patients with infectious ocular pathology other than fungal keratitis were excluded.

Methodology

Procedure : The study's nature and the possible outcomes were explained to the patient and informed written consent was obtained from each participant. The demographic profile, comorbid conditions, clinical features and course of illness were recorded. A questionnaire-based interview was done as per proforma. Detailed medical history, prior medications, precipitating factors, etc., were noted for every case. Thorough ocular examination was done with slit-lamp biomicroscopy, and morphological features of the ulcer were documented.

Age distribution Among the 100 fungal corneal ulcer patients studied the most familiar age group affected was between 41-65 years, followed by 21-40 years and >65 years.

Table 1 : Sex of the patients

Sex	No. of Cases	Percentage
Male	84	84
Female	16	16
Total	100	100

This table shows that most of the patients in this study were male (84%), and the rest were females (16%).



Thus, people from this age group have a considerable socio-economic impact because they are the family's breadwinners.

Gender distribution:

Regarding the gender of the patients, in this study males (84%) were affected more than females (16%).

Occupational characteristics:

In this study, Farmers (59%), Fishermen (28%), Dairy farm workers (4%), others (4%) category which included other professions like students, carpenter & beggar, manual labour (2%) and homemaker (2%) are involved in that order. Occupational preponderance was justified because trauma

with the vegetative matter was a significant risk factor for the occurrence of fungal keratitis.

Geographical distribution:

Table 2: Comparison of rural-urban distribution in different studies

	Bharathietal study ²⁴	NathRetal.study ⁴⁴	Present study
	80.27%	87.9%	69%
Urban	19.73%	11.5%	31%

In our study, 69% were from rural areas, whereas the rest of the 31% were from urban areas. This data coincided well because patients involved in agricultural activity were more commonly from rural areas. There might be a lack of awareness about the disease and unavailability of expert ophthalmic care at village level leads to the delay in Ophthalmic hospital visit. Recent developments in tele-ophthalmology can reduce this burden.

Comorbid factors and predisposing conditions:

There was a history of trauma in 83% patients with various agents like vegetative matter, cow tail, stone and fingernail. 43% of patients had trauma with vegetative matter because most of them were engaged in farming activities. Among them, 61.28% were by vegetative matter.

Table:3 Contribution of different predisposing factors and traumatic agents according to a study in South India²⁴

Cornea Itrauma	92.15%
Co-existing ocular diseases	6.67%
Spheroidal degeneration	2.37%
Post-operative (suture infiltrates)	1.46%
Pre-existing viral keratitis	1.29%
Lid abnormalities	0.64%
Lagophthalmos	0.73%
Adherent leucoma	0.18%
Use of topical steroids	1.19%
Systemic diseases like diabetes mellitus, Leprosy and tuberculosis	16.07%

The present study agrees with the above table by having ocular trauma the most common risk factor for fungal keratitis. Use of protective goggles while performing agricultural activities like harvesting should be recommended to prevent corneal injury and subsequent fungal keratitis.

Immunosuppressant therapy for autoimmune disorders:

Immunocompromised state predisposes fungal keratitis and the duration of treatment is much longer than immunocompetent individuals. In this study, 79% of the ulcers were about <3 mm, 11% were around 3-4 mm, 9% were about 4-6 mm, and 1% was >6 mm in size. Large-sized ulcers > 5 mm required treatment with more than one topical antifungal drug and took a long time to heal. 41% of the patients had the full thickness of the cornea involved, 37% had anterior stromal involvement, and 22% had mid stromal involvement. Out of the 41 patients who had full-thickness involvement of the cornea, 12 patients eventually had a perforation in the cornea at 3-4 weeks despite treating appropriate medications.

Hypopyon:

41% of patients had hypopyon at presentation with its height ranging from 1 to 8 mm. 59% of the patients did not have hypopyon in our study.

Table 26: comparison of the presence of hypopyon among various studies

Study	Percentage of cases with hypopyon
Srinivasan et al. ⁴⁶	66%
Chowdhary et al. ⁴⁵	45%
Present study	41%

Smear positivity:

The smear positivity for fungal elements during the first visit was 61% by either KOH wet mount or Gram's staining in our study. Treatment with the appropriate antifungal agent instead of waiting for culture report. According to a study done in Hyderabad, India, the sensitivity and specificity of corneal scraping in the detection of fungi were as follows:

Table 27: Sensitivity and specificity of corneal scraping in the detection of fungi

	Specificity(%)	Sensitivity(%)
Gram's stain	93.7	89.8
Giemsa stain	96.1	85.2
KOH+calcofluor white	94.3	90.6

Debridement of the ulcer was done in 87 patients, followed by no surgical intervention in 12 patients and therapeutic penetrating keratoplasty in one patient.

Table 19: V.A. at presentation

V.A day1	No. of Cases	Percentage
PL, PR+ -3/60	67	67
4/60-6/60	22	22
6/36-6/6	11	11
Total	100	100

Table 20: V.A. at six weeks

V.A. in the sixth week	No. of Cases	Percentage
PL, PR+ -3/60	48	48
4/60-6/60	25	25
6/36-6/6	27	27
Total	100	100

The above tables show that 67 patients had Visual Acuity between PL, PR+ to 3/60, on day one and on the 6th week, 48 patients had Visual Acuity in that range. Twenty-two patients had visual acuity in the range of 4/60 to 6/60 on 1st visit, and on the sixth week, 25 patients had visual acuity in that range. Eleven cases had visual acuity in the range of 6/36 to 6/6, and on the sixth week, 27 patients had vision in that range.

on microscopic examination.

In this study, culture yielded 98% positivity for fungi. *Fusarium* species was the most common fungi isolated from 32 patients, *Candida* species isolated from their ulcer. Amphotericin B eye drops worked well for patients with yeast keratitis in the present study, better visual outcome and it prevents corneal perforation and the need to perform therapeutic keratoplasty compared to Voriconazole in fungal keratitis. Only one patient had associated scleritis and required systemic antifungal therapy with oral fluconazole 200mg tablets twice daily for two weeks. This patient had no improvement to medical treatment hence underwent therapeutic penetrating keratoplasty.

CONCLUSION

Fungal corneal ulcer continues to be an important cause of corneal morbidity. After studying various demographic factors like age, sex and population, it is found that most of the corneal ulcers are seen in the rural population, especially who sustain an ocular injury with the vegetative matter. The fungal corneal ulcer has affected mainly the working-age group, i.e., 21 to 65 years (87%) and there was a male preponderance (84%). Most of the patients were farmers (59%) and from rural areas (69%). Ocular trauma with the vegetative matter was a predisposing factor in 43% of cases. Diabetes mellitus was the most common systemic association with fungal corneal ulcers (41%). 59% of patients had central corneal ulcers. The corneal ulcers' size was < 20 sq. mm in 79% of the ulcers and 41% of cases had full-thickness involvement of the cornea. Microbiological work-up facilitates specific therapy in fungal corneal ulcers. KOH mounts were in agreement with fungal culture in 61% of cases. KOH wet mount is an efficient tool in establishing the diagnosis and aid early initiation of

treatment. In this study, *Fusarium* was the most common species (32%) among the culture positive cases followed by *Aspergillus* species (30%). Natamycin is the chief topical antifungal agent in the clinician's limited choice to treat fungal corneal ulcers. The superficial ulcers have healed well with natamycin eye suspension, making it the first drug of choice in filamentous fungal infections of the cornea. Fortunately, most of them (87%) healed with scar formation after appropriate therapy and sustained follow up. Systemic antifungal treatment is indicated in associated scleritis and endophthalmitis.

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