



CLINICAL STUDY OF FUNGAL CORNEAL ULCER

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ABSTRACT

Corneal infections of fungal etiology (19-45%). are common in India Aspergillus (16-53%) and Fusarium (10-47%) are the common incriminating pathogens. 100 patients with fungal corneal ulcers were recruited for the study. All corneal ulcer patients with positive 10% KOH preparation and/or positive fungal culture results were included in the study. In this study Fusarium was the most common species among the culture positive cases followed by Aspergillus species. Natamycin is the chief topical antifungal agent used. Ocular morbidity in fungal infections tends to be greater than that in bacterial keratitis, because the diagnosis is often delayed History of injury with vegetable matter, dry looking ulcer, feathery edges, satellite lesions, endothelial plaque and thick hypopyon form a typical presentation. So it is necessary to be aware of the clinical presentation of fungal corneal ulcer to promptly suspect its presence and initiate proper laboratory investigation and implement optimal treatment.

KEYWORDS : Corneal Ulcer ,Keratitis ,Corneal Abrasion**INTRODUCTION**

Corneal ulcer is a major public health problem in the developing world causing prolonged ocular morbidity and visual impairment. Corneal blindness is responsible for 1.5 to 2 million new cases of monocular blindness every year in which ocular trauma and corneal ulceration are significant contributors.¹

In a vast agricultural country like India, particularly where primary health care and referral systems are weak, minor eye injuries sustained in agricultural farms often lead to corneal ulceration of fungal etiology and loss of vision.²

There are currently an estimated 15 million blind people in India. 6.8 million Of these suffer from corneal blindness with vision less than 6/60 in at least one eye, and of these, about 1 million have bilateral corneal blindness. If the present trend continues, it is expected that the number of cornea blind individuals will increase to 10.6 million by 2020.³

Corneal infections of fungal etiology (19-45%). are common in India Aspergillus (16-53%) and Fusarium (10-47%) are the common incriminating pathogens.⁴

Ocular morbidity in fungal infections tends to be greater than that in bacterial keratitis, because the diagnosis is often delayed History of injury with vegetable matter, dry looking ulcer, feathery edges, satellite lesions, endothelial plaque and thick hypopyon form a typical presentation.

AIMS AND OBJECTIVES OF THE STUDY :

The aims of this clinical study are as follows:

1. Mode of presentation.
2. Risk factors.
3. Investigations regarding the type of fungus.
4. Clinical presentation.
5. Prognosis with regard to the available mode of therapy and their results.

METHODOLOGY:-**Source of Data:**

The materials for the study were drawn from corneal ulcer patients attending the Outpatient Department at Regional eye Hospital, Kakatiya Medical College, Warangal from February 2017 to February 2018 under the care of different Units and 100 patients with fungal corneal ulcers were recruited for the study.

Method of collection of data:

Hundred cases of corneal ulcer attending the outpatient department were selected for the study.

Inclusion Criteria:

All corneal ulcer patients with positive 10% KOH preparation and/or positive fungal culture results were included in the study.

Exclusion Criteria:

1. Patients who are non-compliant.
2. Patients who are not available for follow up for a required period of time.

After taking informed consent, each patient was subjected to a detailed history taking followed by detailed ocular examination as per the enclosed proforma. Patients were advised to get admitted to the hospital for observation and better follow up. If not they were advised to attend follow up in OPD without fail.

1. Examination of anterior segment and corneal ulcer was done in detail with the help of a slit lamp biomicroscope.
2. Recording of visual acuity using Snellen's chart.
3. Fundus Examination.
4. Lacrimal sac syringing.
5. Fluorescein staining.
6. Routine laboratory investigations:
 - a) Complete hemogram
 - b) RBS
 - c) Urine - sugar
 - d) HIV, HBsAg

Microbiological investigations:

The sample for was obtained by corneal scraping. The cornea was anaesthetized using 4% lignocaine solution and scraping was done using sterile No. 15 Bard Parker blade from the margins of the corneal ulcer.

The following microbiological investigations were done:

- a. 10% KOH preparation
- b. Gram's stain
- c. Fungal culture was done using Sabouraud's dextrose agar medium.
- d. Bacterial culture using blood agar and chocolate agar.

Management:

Management of the patients proceeded on urgent basis and broadly classified.

a. Medical
b. surgical

MEDICAL MANAGEMENT:

After obtaining the reports of positive 10% KOH preparation, topical antifungal drugs like natamycin 5% eye suspension, was used hourly for the first 48 hours and then decreased to 2nd hourly. Initially only natamycin suspension was used if the smear showed presence of septate hyphae and the response was noted. If the smear showed pseudohyphae then fluconazole eye drops was also added. In some cases which were not responding to natamycin alone, fluconazole eye drops was added. Topical therapy was continued at least 3rd hourly for atleast 2 weeks after healing of the ulcer.

Along with the above drugs, atropine 1% eye ointment was used initially 8th hourly and then tapered according to the response.

Antiglaucoma medications like topical timolol maleate 0.5% eye drops and acetazolamide 250 mg tablets were prescribed wherever necessary.

In some cases topical antibacterial drops like moxifloxacin 0.5% was added on the basis of Gram's stain report showing evidence of bacterial infection.

Systemic antifungal therapy was used in corneal ulcers with deep stromal involvement, ulcers extending to the limbus or any evidence of anterior chamber involvement. Itraconazole 200 mg tablets were given daily and Fluconazole 200 mg tablets were given twice a day for at least a period of 15 days. Before starting systemic fluconazole liver function tests were done.

SURGICAL MANAGEMENT :-

1. Debridement of the ulcer: This procedure was performed under topical anaesthesia on a slitlamp using BardParker blade No.15. This was done every 48 hours to help better penetration of drugs until the ulcer showed decrease in infiltration.

2. Therapeutic penetrating keratoplasty: In cases of non-healing ulcers after adequate medical therapy for a period of four weeks, they were referred to higher center.

Along with the surgical mode of treatment the necessary antifungal, antiglaucoma and cycloplegics were continued. The patients were examined on day 1, 2, 3, followed by first, second, third, fourth, fifth and sixth week. At each follow up ulcer details and visual acuity was recorded.

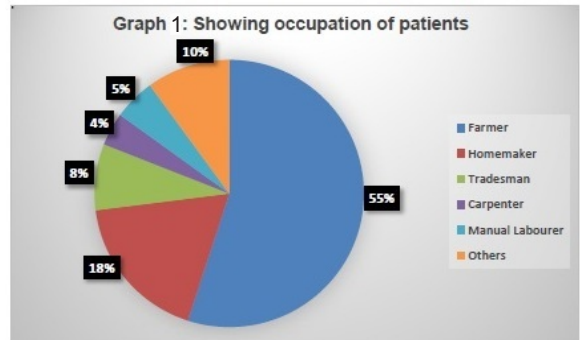
DISCUSSION:

Among the 100 fungal corneal ulcer patients studied the commonest age group affected was between 41-60 yrs, followed by 21-40 years, >60 yrs and <20 yrs. In Ranjini and Waddepally study the commonest age group was between 41-60 years which was in agreement with the present study.⁵ This has a considerable socioeconomic impact because this age group people are bread winners of the family. In similar other studies the commonest age group was 31-40 years.⁶

Regarding the gender of the patients, in this study males (70%) were affected more than females (30%). In other similar studies male subjects were more affected than females about 61.5%.⁵ This could be attributed to the increased outdoor activity of men especially in the working age group. Farmers (55%), Homemaker (18%), others (10%) category which included other professions like students and engineers, tradesman (8%), carpenters (4%) and 5% manual labourer in that order were affected. In Bharathi et al study, farmers contributed to 64.75%, homemaker 5.11%, students 8.11%, tradesman 6.48%, unemployed 1% and labourer 14.52%.⁶

Table 1 : Occupation of patients

Occupation	No. of Cases	Percentage
Farmer	55	55
Homemaker	18	18
Tradesman	8	8
Carpenter	4	4
Manual Labourer	5	5
Others	10	10
Total	100	100



This occupational preponderance was justified because trauma with vegetative matter was an important risk factor for the occurrence of fungal keratitis (Table - 1).

In this study, the next common organism was *Aspergillus flavus* (25%), followed by *Aspergillus fumigatus*.

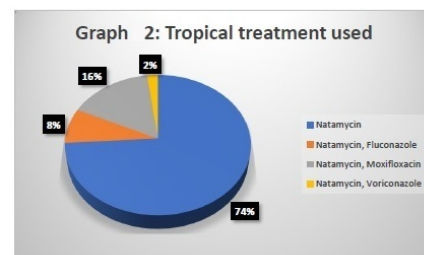
In Chowdhary et al study, *Aspergillus niger* was found to be the most common species.⁷

In this study, no case of *Candida* keratitis was found. Only two patients had infection with *Cladosporium* which is filamentous dematiaceous fungus. In other studies dematiaceous fungi (10-29%) have been isolated.⁸ Yeast infection is generally low in India.

74% patients were treated with natamycin 5% eye suspension only (Table- 2), 16% were on natamycin and moxifloxacin eye drops. 8% patients used both natamycin and fluconazole eye drops. 2 patients were treated with natamycin and voriconazole 1% eye drops. Natamycin was the preferred drug in this study because it has broad spectrum fungicidal activity and is available commercially at an affordable price to the poor patients.

Table 2 : Topical treatment used

DRUGS	No. of Cases	Percentage
Natamycin	74	74
Natamycin, Fluconazole	8	8
Natamycin, Moxifloxacin	16	16
Natamycin, Voriconazole	2	2
Total	100	100



In Loh RA et al study, natamycin was the most commonly (96%) used treatment for ulcers caused by filamentous fungi followed by amphotericin (75%) and voriconazole (63%), However voriconazole (79%) was most often listed as the preferred topical treatment in an

ideal world compared with natamycin (55%). Approximately half of the respondents use combination topical therapy (56%) and the remainder monotherapy. Monotherapy with voriconazole (69%) or natamycin (28%) in filamentous fungal keratitis and voriconazole (47%), amphotericin (39%), and natamycin (11%) in yeast keratitis. The most common reasons cited for not using the preferred treatment were cost and a desire for further evidence to support preferred treatment.⁹ A study by Xuguang et al showed that *Fusarium* species was susceptible to natamycin.¹⁰

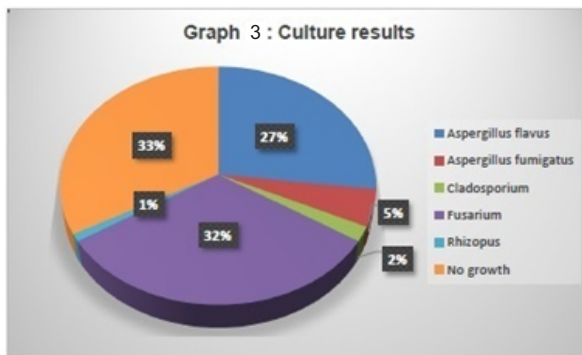
In this study, only those ulcers with deep stromal or full thickness involvement were treated with systemic antifungals in the form of oral itraconazole 200 mg tablets BD atleast for a period of two weeks, as it is preferred in filamentous fungal infection.

Out of 29 patients who were treated with systemic antifungal drugs 11(37.9%) healed whereas 18(62%) had complications like perforation and increase in infiltrate size.

In 95% of patients debridement was done and Cultures obtained (Table -3). Natamycin eye drops was the most common antifungal used and debridement enhances the drug penetration. In 5 patients debridement was not done for severe corneal thinning was present and risk of perforation by debridement, but eventually these ulcers had corneal perforations.

Table 3 : Culture results

Organisms isolated	No. of Cases	Percentage
<i>Aspergillus flavus</i>	27	27
<i>Aspergillus fumigatus</i>	5	5
<i>Cladosporium</i>	2	2
<i>Fusarium</i>	32	32
<i>Rhizopus</i>	1	1
No growth	33	33
Total	100	100



In ten patients, non healing ulcers were developed, despite of treatment with the standard drugs. In Chowdhary et al study, penetrating keratoplasty was done in 33% of patients and in Tanure et al study 25 % of patients underwent keratoplasty.¹⁰ In the present study non-healing ulcer patients needed therapeutic keratoplasty but it Could not be done due to non - availability of donor corneas so they were referred to higher centres for treatment.

Despite the availability of several antifungal agents fungal keratitis continues to have poor visual prognosis because of the resultant corneal scar of varying density. 64% percent patients had VA ranging from HM+ to CF 3m at presentation. Most of them were central in location. Only 16 patients had improvement and moved to the CF 4m to 6/6 visual acuity group. 10% patients had visual acuity on day 1 in the range of 4/60 to 6/60. In the present study 26 (26%) patients had visual acuity on day 1 between 6/36 to 6/6 at presentation. These ulcers were either paracentral or peripheral in

location and involved the anterior stroma or midstroma. All of them healed and at 6 weeks follow up they had atleast one line improvement in visual acuity with 6/36 or better in 34 % patients. In Tanure et al study, 54% patients final visual acuity of 6/36 or better.¹¹ this underscores the emphasis on intensive treatment and sustained followup.

Among 100 patients, 82(82%) healed with corneal opacity, 8 (8%) had perforation of the cornea and 10 cases were non healing whereas in Nath et al study 69 (43.9%) healed with corneal opacity, 19 (12.1%) cases had perforation and 2(1.3%) cases developed end ophthalmitis.¹²

Corneal ulcer has afflicted mainly the working age group i.e., 21 to 60 years (86%).

- There was male preponderance(70%).
- Most of the patients were farmers (55%) and from rural areas (83%).
- Trauma with vegetative matter was a predisposing factor in 57% of cases.
- 51 % percent patients had central corneal ulcers.
- The size of the corneal ulcers was < 20 sq. mm in 60 % of the ulcers and 29% cases had full thickness involvement of the cornea.
- KOH wet mount is an efficient tool in establishing the diagnosis and to facilitate early initiation of treatment.
- Natamycin is the chief topical antifungal agent in the limited armamentarium of the clinician to fight the menace of fungal corneal ulcer.
- Fortunately, majority of them (82%) healed with intensive therapy and sustained follow up.
- However the visual outcome is gloomy because of the resultant corneal scar, adding to the waiting list of Keratoplasty.

CONCLUSION

Fungal corneal ulcer continues to be an important cause of corneal morbidity. The various demographic factors like age, sex and population were studied and it was found that most of the corneal ulcers are seen in the rural population especially who have trauma to the eye with vegetative matter.

Microbiological work up goes a long way in facilitating specific therapy in fungal corneal ulcers. KOH mounts were in agreement with fungal culture in 67 % of cases and so it can be used as a quick and reliable method to find out fungal etiology of corneal ulcers and treatment can be started immediately without waiting for the culture reports to arrive.

In this study *Fusarium* was the most common species among the culture positive cases followed by *Aspergillus* species.

The study shows that ulcers with deep stromal involvement, only 37.9% showed signs of healing which again stresses the importance of early recognition of the correct etiology.

The superficial ulcers have healed well with Natamycin eye suspension, which makes it the drug of first choice in filamentous fungal infections of the cornea.

Systemic treatment is indicated in deep corneal involvement. It helps in prevention of further complications like perforation.

Surgical debridement of the ulcer in the initial stages helps in reducing microbiological load and Increase in drug penetration. However caution has to be exercised in ulceration with thin floors. Penetrating keratoplasty should be resorted to in non healing ulcers and perforated ulcers subject to availability of healthy donor corneas.

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