Isolation of common fungi and treatment of mycotic keratitis

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Abstract

Background: This study was conducted to isolate the common fungi from the corneal ulcer of the patients and to treat fungal keratitis with appropriate antifungal drugs.

Methods: All the patients with corneal ulcer who visited the Ophthalmology OPD at SSMCH, Tumkur were evaluated. Further, all the cases of corneal ulcer were examined with slit lamp biomicroscopy and corneal scrapings taken are subjected to KOH preparation and those with fungal etiology were identified and taken up for the study. The patients were taken into the study irrespective of the previous disease and previous medication.

Results: Out of 20 patients recognised as fungal corneal ulcer, most of the patients belong to the age of 11 to 50 years as they are the working population. The patients with fungal corneal ulcer showed minimal symptoms than signs we lead to delayed avail to treatment. The earliest time the patient visited the hospital after the onset of the disease, was 2 days and the longest duration was 2 months. Those patients with a history of agricultural trauma had either remained negligent in early stage or tried all possible remedies within their easy reach in their initial conditions and come only when the pain became intractable with loss of vision.

Conclusion: A high index of suspicion should be raised in cases with history of trauma and clinical features highly suggestive of fungal corneal ulcer (dry elevated surface, stromal infiltration with hypnate margins). 10% KOH smear is a rapid and sensitive method of diagnosis which is confirmed by SDA cultures that is the most sensitive and specific test available. Aspergillus and Fusarium are the most common isolates. Fluconazole and Natamycin are the drugs of choice in most filamentous keratitis. Most of the cases heal with some grade of opacity, ultimately requiring a therapeutic Penetrating Keratoplasty to regain useful vision.

Keywords: Aspergillus, Corneal ulcer, Corneal opacity, Fungal Keratitis, Fusarium, Penetrating keratoplasty

Introduction

The cornea is a tissue specialized to refract and transmit light and is responsible for three quarters of the diopteric power of the eye and hence any injury to it can cause considerable visual disturbances.(1,2)

The increasing incidence of fungal keratitis is related to: A greater recognition of the clinical features, Improvement in laboratory techniques and better reporting, indiscriminate use of corticosteroids, antibiotics and immunosuppressive drugs. In early stage fungal Keratitis can be confused with other types of corneal ulcers. (3) Diagnosis and treatment of fungal Keratitis at the earliest is important in preventing vision threatening complications. (3)

Mycotic Keratitis due to one or other of the multitude of the species is known to affect man. In India, such infections have long been one of the main ophthalmic problems. (4,5,6) In the last few decades, the incidence of corneal infections has increased considerably in western countries, which seems to be due to two factors, an upset of the normal symbiosis between bacteria and fungi since the introduction of antibiotics into ophthalmic therapy, and resistance of the tissues from the topical use of corticosteroids which allow fungi normally saprophytic and symbiotic to become facultative pathogens. (7,8)

In a tropical country like India, It is not uncommon to find infections of the cornea with varied organisms of the soil where agriculture is the main occupation of the people and mycotic keratitis often encountered in ophthalmological practice. (9,10,11,12)

The publications on mycotic infections of the eye have been increasing over the past few years as the result of better diagnostic methods and the ability to recognise that fungi which heretofore have been considered non-pathogenic do have the ability to infect the eye. Furthermore, absolute increase in the number of fungus infections has probably resulted from the widespread and indiscriminate use of corticosteroids in ocular therapy.

The consideration of fungal infection today and in the future rests on the historical admonition of earlier workers to keep in mind, not only that proper diagnosis be established, but perhaps of greater importance, to prevent fungal infections. Corneal blindness is a major challenge to the modern world which in majority due to corneal ulcers. So far as ophthalmological lesions are concerned, keratomycosis is of importance because of the ravages it causes leaving the eye blind. (13-20) The ocular mycosis should always be one's guard when one recognizes corneal ulcers. (21,22)

Regarding the treatment there are various antifungal agents which are available. The problem of therapy of mycotic infections is still today an open chapter. Based on the above background, this study is conducted to isolate the specific fungi of mycotic infections of the cornea.
Materials and Methods

All the patients attending the Ophthalmology OPD with corneal ulcer were examined and those with fungal etiology were identified and taken up for the study. A detailed history was taken in every case including personal information (Name, age, occupation, their residence and their socio-economic status). History of trauma and its nature, foreign body getting into the eye and the nature of foreign bodies (dust, inflorescence, vegetable matter etc.). Previous application of antibiotics, corticosteroids, Antifungals, native medicines etc. was asked and noted. Previous history of any illness especially skin disease of fungal origin was taken to corroborate the present condition wherever relevant.

Symptoms of pain, redness, watering, lid swelling, visual disturbance, photophobia, foreign body sensation were recorded.

After a rough general examination a detailed ocular examination was done using slit lamp. The unaffected eye was also examined for pathology. Characteristics of the ulcer were observed and features suggesting of keratomycosis like the dry elevated surface of the ulcer and the stromal hyphate infiltrations were noted. Other features looked for were satellite lesions, endothelial plaques, Anterior Chamber reaction with hypopyon and immune ring.

After examination scrapings from the ulcer were taken at the slit lamp under topical anaesthesia using 4% Xylocaine drops. Smears were made immediately and observed using 10% KOH mount and Grams stain. The specimen was inoculated on Sabouraud’s Dextrose agar and cultures were kept at room temperature for 2 weeks before interpreting as negative. Identification of the fungus was made by Lacto phenol Cotton Blue mount from the culture.

Only those ulcers with corroborative laboratory evidence were taken for study and not just on clinical features or history. All the cases considered for the study were KOH positive irrespective of clinical features, KOH and culture positive and culture positive, irrespective of clinical features and smears.

The cases included in the study were primarily treated with 0.3% fluconazole every 1 hour and tapered with good progress based on KOH smear. Adjuvant therapy in the form of 1% Atropine ointment was used along with Tablet Acetazolamide 250 mg twice or thrice daily (if digital tension was raised) and Vitamin-A & C Tablets were also given. Pad and Bandage was applied and if no improvement noted within 72 hours, 5% Natamycin was added. In cases with raised, dry lesions, a daily or twice a week debridement was done to debulk the fungus load and allow better drug penetration. Daily assessment was made by slit lamp examination and drawings were made.

Results

In this study patients who were KOH positive and SDA positive were taken. The others were excluded. Total number of Corneal Ulcers examined was 50, out of which 20 cases were of fungal etiology. Most of the affected cases (80%) were observed in the age group of 11 to 50 years, as they are more involved in outdoor and physical activities, the results of which are shown in the following table 1. 60% of the patients were males and most of them belong to low socio economic status.

![Age and Sex distribution](image)

This study showed peak incidence of the fungal corneal ulcer in the months of October- March, as shown in the following Fig.

![Seasonal Distribution](image)

Farmers and outdoor workers constituted 80% of the cases, as they are more prone to injury with vegetative matter as shown in the following graph.
A definite history was present in 70% of cases. 75% of these were with vegetable matter and 25% with dust/stone. Out of the 15 cases with history of trauma with vegetable matter, most of them were with stick, paddy husk or weed.

Post trauma with the vegetative matter only 20% of patients sought treatment within two days, while 65% between 1st and 2nd weeks. This reflects on both the accessibility to health care facilities and negligence. 35% of cases, coming to our hospital, sought treatment between 1-10 days and 50% of cases visited between 11-20 days. The cases which reported later went in for complications like perforation and endophthalmitis.

The most common feature was the dry surface of the ulcer followed by hyphate edges, Descemet's folds and hypopyon. Endothelial plaque and immune ring portended poor prognosis but sample size was small.

There was not much significant difference in the number of cases with central and those with paracentral ulcers and of these 18 cases, 13 cases had good visual outcome. Two cases were total ulcers of which one perforated and one went in for endophthalmitis.

Lacrimal syringing and random blood sugars to rule out diabetes was done in all the patients. Patients having chronic dacryocystitis underwent Dacryocystorhinostomy. If Diabetes was diagnosed the patients were treated accordingly.

In this study both Fusarium and Aspergillus were found in equal numbers. The patients who reported to the Hospital early had good response to treatment.
Fusarium 8 40
Aspergillus 8 40
Curvularia 3 15
Penicillium 1 5
Candida - -

Out of the 20 cases, after treatment 18 healed with opacity of which 7 were of macular grade, 6 were of nebular grade and 5 were of leucomatous grade. Of the remaining 2 cases, 1 perforated and 1 case went for endophthalmitis. Outcome of the perforated cases was also observed. Anterior staphyloma was seen in 1 case, Phthisis bulbi in one case and spontaneous reformation of AC with adherent leucoma in 1 case.

Treatment response with antifungals is described as good or poor response as shown in the table below.

<table>
<thead>
<tr>
<th>Drug</th>
<th>No. of patients</th>
<th>Response</th>
</tr>
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<tbody>
<tr>
<td>Topical Fluconazole</td>
<td>11</td>
<td>09 02</td>
</tr>
<tr>
<td>Topical Fluconazole/ with Natamycin</td>
<td>06</td>
<td>03 02</td>
</tr>
<tr>
<td>Topical Fluconazole/ with Nistin</td>
<td>03</td>
<td>03 -</td>
</tr>
</tbody>
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Almost i.e., 55 to 60% of the patients were treated with topical Fluconazole alone had good response. In other patients topical natamycin and nistin were used who did not respond to only fluconazole. In some of the cases except those with impending perforation and deep stromal infiltration, therapeutic debridement was done. Patients with corneal opacity were referred to higher centre for optical keratoplasty.

Conclusion
Fungal keratitis is an infection of young healthy people, who are more involved in outdoor work and history of trauma to the eye with vegetative matter. A high index of suspicion should be raised in cases with such history and clinical features highly suggestive of it via a dry elevated surface, stromal infiltration with hyphate margins. 10% KOH smear is a rapid and sensitive method of diagnosis which is confirmed by SDA cultures that is the most sensitive and specific test available.

Aspergillus and Fusarium are the most common isolates. Fluconazole and Natamycin is the drug of choice in most filamentous keratitis. Most of the cases heal with some grade of opacity, ultimately requiring a
therapeutic Penetrating Keratoplasty to regain some useful vision.

References