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## PROFILE OF CORNEAL ULCER IN A TERTIARY EYE CARE CENTRE

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**ABSTRACT:** To review the epidemiological characteristics, microbiological profile, and treatment outcome of patient with microbial keratitis. **METHODS AND MATERIALS:** All the patients presenting with chief complains of pain, redness, photophobia, watering, and who on examination were stain positive with corneal stromal infiltrate underwent standard microbiological evaluation of their corneal scrapings. Patients were divided into bacterial, viral, and fungal keratitis as diagnosed on the basis of clinical and microbiological findings and treatment was started. **RESULTS:** Out of 67 cases of microbial keratitis 12 (17.9%) were culture-proven. Patients with agriculture-based activities were at greater risk of developing microbial keratitis and patients with ocular trauma were more likely to develop microbial keratitis. A significantly larger number of patients with fungal keratitis required surgical intervention compared to bacterial and viral keratitis. Healed corneal scar was observed in 36 (53.7%) of patients with bacterial, fungal and viral keratitis. **CONCLUSION:** While diagnostic and treatment modalities are well in place the final outcome is suboptimal in fungal keratitis. With more effective treatment available for bacterial and viral keratitis, the treatment of fungal keratitis is truly a challenge.

**INTRODUCTION:** Corneal infections are the second most common cause of monocular blindness after un-operated cataracts in the developing countries. In a 30-year period survey, causative organisms were identified on Gram's stain and culture in 547 of 677 cases of infectious corneal ulcers. Even if no organisms were seen on Gram's stain, culture results were often positive. Staphylococcus was the most common isolate; Moraxella, Pseudomonas, and Streptococcus pneumoniae were the next most frequent pathogens. Only 1% of cases were fungal. Of some help in identifying the causative organism were locations, presence or absence of hypopyon, and perforation of the ulcer.

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The epidemiological pattern and causative agents for suppurative corneal ulcer varies significantly from country to country, and even from region to region within the same country. It is important to determine the “regional” etiology within a given region for comprehensive strategy for the diagnosis and treatment of corneal ulcer. The purpose of the study was to evaluate all suppurative keratitis seen at a tertiary eye care centre over a period of six months.

**METHODS AND MATERIALS:** All the patients presenting to us with chief complaints of pain, redness, watering, photophobia and who were stain positive were taken into account. Ulceration was defined as a loss of corneal epithelium with underlying stromal infiltration and suppuration associated with signs of inflammation with or without hypopyon. Ulcers with typical features of healing ulcer, interstitial keratitis, sterile neurotropic ulcers, and any other ulcers associated with autoimmune conditions were excluded.

At presentation, information pertaining to demographic features, duration of symptoms, risk factors, and occupational status was documented for every suspected case of infectious keratitis.

**CLINICAL PROCEDURES:** Cornea evaluation was carried out using a slit lamp, biomicroscope and findings were recorded. Detailed diagrammatic documentation of the ulcer was done and recorded on a daily basis. Associated ocular conditions were noted. After a detailed ocular examination, corneal scraping was performed under aseptic conditions from each ulcer using a sterile Bard-Parker blade (No. 15). The procedure was performed under magnification of a slit lamp following instillation of preservative free 2% lignocaine hydrochloride. Material obtained from scraping of the bleeding edge and base of each ulcer was inoculated on relevant media and sent for microbiological culture and sensitivity.

**LABORATORY PROCEDURE:** For bacterial cultures, the materials were inoculated aerobically at 37 C onto blood agar, chocolate agar, and potato dextrose agar (PDA). Cultures on blood agar and chocolate agar was evaluated at 24 hours and 48 hours, and then discarded if there was no growth. For fungal cultures, the materials were inoculated on to Sabouraud dextrose agar (SDA) and incubated at room temperature, examined daily, and discarded after two weeks if there was no growth. Bacterial cultures were considered positive only if growth of the same organism was demonstrated on both media or there was semi confluent growth at the site of inoculation on one media with identification of morphological characteristics of similar organism in Gram Stain. The specific identification of bacterial pathogens was based on microscopic morphology, staining characteristics, and biochemical properties using standard laboratory criteria. Fungi were identified by their colony characteristics on SDA and by the morphological appearance of the spores in lactophenol cotton blue stain, and in some cases by slide culture method. If hyphae were observed in corneal smear by microscopy in KOH mount preparation, but failed to grow in culture, the causative organism was reported as fungal.

Treatment was started according to microbiological reports. If no organism was detected (due to antimicrobial therapy received prior to presentation) treatment was started according to clinical sign and symptoms.

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**RESULTS:** During the study period of six months 67 patients with the clinical diagnosis of corneal ulcer were reevaluated at our institute. 12 (17.9%) of patients were culture positive, out of which 9 (8.95%) were positive for fungal and 3 (4.47%) were positive for bacterial species 61 (91.04%) patients were males and 6 (8.96%) were females with male is to female ratio of approximately 10:1. Most of the patients were in the middle age group (85.07%). Majority of the patients were seen within 1 week of their illness at our hospital, so 23.29% of patients had received prior antimicrobial therapy somewhere else. Of the patients who were on some form of topical medications, maximum were taking antibiotic and antifungal eyedrops.

A history of recent corneal injury was obtained in 37 patients (55.2%). 24 patients (35.8%) had corneal injury with vegetative material; mostly paddy, paddy stalk, jute plant, twig of a tree, mud, sand, etc. 13 (19.4%) had injury with non-vegetative material like those who were soft contact lens users, postsurgical, foreign body, etc. All patients were started on medical therapy initially, however, few of them required surgical intervention. Significantly more number of patients required surgical treatment in fungal keratitis compared to bacterial keratitis.

TABLE 1: AGE DISTRIBUTIONS

Up to 30 years	0 (0%)
31-60 years	57 (85.07%)
>60 years	10 (14.9%)

TABLE 2: SEX DISTRIBUTIONS

Male	61 (91.04%)
Female	6 (8.96%)

TABLE 3: PRIOR H/O TRAUMA

Vegetative Material	24 (35.8%)
Non-vegetative	13 (19.4%)
No H/O trauma	30 (44.78%)

TABLE 4: PRIOR ANTIMICROBIAL THERAPY

Received	16 (23.29%)
Not Received	51 (76.71%)

TABLE 5: TYPES OF CORNEAL ULCER

Bacterial	7 (10.44%)
Viral	26 (38.8%)
Fungal	34 (50.75%)

TABLE 6: TYPE OF FUNGAL SPECIES ISOLATED IN PATIENTS WITH MICROBIAL KERATITIS

Filamentous Fungi	6 (8.95%)
Non-filamentous Fungi	3 (4.47%)

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TABLE 7: TREATMENT OUTCOME IN PATIENTS WITH MICROBIAL KERATITIS

Healed scar	36 (53.7%)
Adherent leukoma/perforation	5 (7.46%)
Evisceration	2 (2.99%)
Non-healing	9 (13.4%)

**DISCUSSION:** A variety of factors determine clinical outcome in microbial keratitis and the epidemiological patterns vary from one country to the other and in different geographical areas in the same country. A comprehensive data is important to develop appropriate diagnostic and therapeutic strategies. This study reports the experience with 67 patients of microbial keratitis in a tertiary eye care center in India. The data reported here is expected to be useful in all areas of the world where fungal keratitis is relatively more prevalent and is commonly considered in the differential diagnosis of microbial keratitis.

The male preponderance in this series was observed not only in the overall clinically suspected cases of microbial keratitis but also in culture-proven cases of microbial keratitis (male: female:: 10: 1). Though both sexes develop corneal ulcers more commonly in the middle decades of life, a significant male preponderance has been reported by most previous studies including those in children and elderly patients. Considering the predominant predisposing factor of trauma in all types of microbial keratitis, the probable reason for male preponderance is obvious. Ocular trauma was significantly more associated with outdoor occupation in this series.

Around half of the patients had visited a physician prior to presentation at this institute and had received antimicrobial agents that were appropriate, albeit on lower dosage, for the microbial agent involved. Therefore we believe that despite the patient being on prior antimicrobial therapy, microbiological investigation may succeed in establishing etiological diagnosis. It is interesting to note that a majority of our patients presented within one month of onset of symptoms. This indicates easy availability of transport to patients and is in contrast to the situation in other developing countries such as Nepal where 19.3% of the patients took longer than a month to reach the hospital for treatment. Transport facilities and access to healthcare systems are important issues in the developing countries and our analysis points at optimum availability in the area catered by this institute.

Direct microscopic examination of corneal scrapings provides rapid diagnosis and forms the basis for instituting initial antimicrobial therapy which may be modified later according to culture reports. An accurate smear diagnosis therefore becomes important in achieving optimum treatment outcome. The detection of fungi was much higher in the smears than it was for bacteria. The detection rate for bacteria (Gram stain) was reduced by 10.9% when a correlation of the presence of similar bacteria in smears and cultures was made. We recently analyzed the utility of Gram stain in the diagnosis of early and advanced bacterial keratitis.

A high prevalence of fungal keratitis caused by Filamentous fungi in warmer climates has been widely reported. All cases (pure and polymicrobial) were considered together in this series; fungi were isolated in 34 (50.75%) patients, a frequency similar to that reported from Madurai. Some of the fungal isolates could not be definitely identified due to lack of characteristic spores in the medium used at our center for culturing fungus (Sabouraud dextrose agar, potato dextrose

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agar). Difficulty in speciation of fungi owing to lack of sporulation has been faced by other investigators as well. Attempts were not made in this study to use spore-enhancing media for fungal isolates on a routine basis, which probably would have helped in speciation of some of the unidentified isolates.

A significantly larger number of patients with fungal keratitis required surgical intervention compared to bacterial and viral keratitis thus indicating a poor response to treatment in fungal keratitis compared to bacterial and viral keratitis. This study shows that although bacterial and viral keratitis can be treated effectively, the treatment of fungal keratitis remains a challenge.

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