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Microbial profile of corneal ulcer in a tertiary eye care hospital at Tamil Nadu

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Abstract
Purpose: To identify the most common etiological agent in corneal ulceration in a tertiary care eye hospital.
Materials and Methods: A total of 50 patients with suspected infectious corneal ulcers presenting to ophthalmology out-patient department in Rajah Muthiah Medical College and Hospital were evaluated. Sociodemographic data and information pertaining to risk factors were recorded. All patients were examined and corneal cultures and scrapings were performed.
Results: Of 50 patients microbiological etiology was established in 39 cases (78%). Of these 36(72%) were male. Of 39 positive cases 42% were fungi and 36% were bacterial and 22% showed no growth. The most common isolated fungus was fusarium (67%) followed by aspergillus (33%). Streptococci was the most common isolated bacteria.
Conclusion: Routine microbiological examination of patients with corneal ulcer is necessary to analyze the changing trends of the etiology.

Keywords: Keratitis, corneal ulcer, fungal, bacterial

Introduction
Infectious keratitis is a leading cause of corneal blindness in developing countries. By definition, microbial keratitis is a corneal epithelial defect with an underlying stromal infiltration with signs of acute inflammation. The first step in diagnosis of corneal ulcer is to determine whether it is infective or non-infective. A careful history and thorough examination is needed to differentiate whether it is infective or non-infective.
Ocular trauma, by any mechanism from contact lens to occupational injuries can cause corneal abrasions, which permit infection to enter the corneal stroma through the epithelial defect. If proper treatment is not sought, a severe inflammatory response can ensue, resulting in corneal scarring or even perforation. Individuals with corneal opacity in developing countries, may not have access to corneal donor material or transplantation services, thus may be burdened with lifelong visual impairment [1].

Materials and methods
A prospective study is designed to examine 50 consecutive patients presenting with microbial keratitis in outpatient department of ophthalmology, Rajah Muthiah Medical College and Hospital, Chidambaram. All patients with microbial keratitis attending outpatient department were analysed during a 1 year period from October 2019 to November 2020.
Patients were selected on the basis of selection criteria as follows:

Inclusion criteria
1. All cases of keratitis who came to outpatient department of Rajah Muthiah Medical College and Hospital were included.
2. Patients with history of trauma were included.

Exclusion criteria
1. Patients who were not willing to participate.
2. Mooren ulcer
3. Neurotrophic ulcer
4. Herpes simplex keratitis

After obtaining consent from the patient, a standardized proforma was used to record the data. Detailed history was recorded for each patient regarding age, occupation, residence, nature of injury, predisposing factors, time of onset of symptoms and previous treatment history (antibiotics, steroids). A comprehensive eye examination was performed and included assessment of visual acuity and detailed examination of anterior segment. Visual acuity of each eye was tested separately using a distance vision chart at 6 metres. Anterior segment was evaluated by slit lamp biomicroscopy to locate site, size, surface, floor, edge and depth of ulcer. Fluorescein staining was done to mark the extent and details of ulcer. Corneal sensation was checked. Hypopyon if present its height, consistency were noted. Nasolacrimal duct syringing done to rule out chronic dacryocystitis. IOP was measured by non-contact tonometry. After instillation of local anaesthetic 5g/l proparacaine hydrochloride, under strict aseptic precautions, corneal ulcer scraping was done using Bard Parker blade no.15 or 26 gauge needle. Scrapings were taken from the base and edge of the ulcer.

The collected specimen were placed on glass slides for grams stain and 10% KOH mount, and also in culture media (blood agar, chocolate agar and SDA agar) in C shaped streaks. The specimens were clearly and correctly labelled before sending to microbiological laboratory. The culture was examined daily for growth, colony characteristics, pigmentation and rapidity of growth. All results were recorded in a master chart [2].

The patients were treated with debridement of necrotic tissue for better antibiotic penetration, antibiotics or fortified antibiotics, antifungals, cycloplegics and analgesics.

Patients were advised to report daily to OPD for review until clinical healing of ulcer was achieved.

Results

A total of 50 patients were enrolled in our study and reviewed periodically over a period of one year.

Fig 1: Photograph of a patient showing fungal corneal ulcer

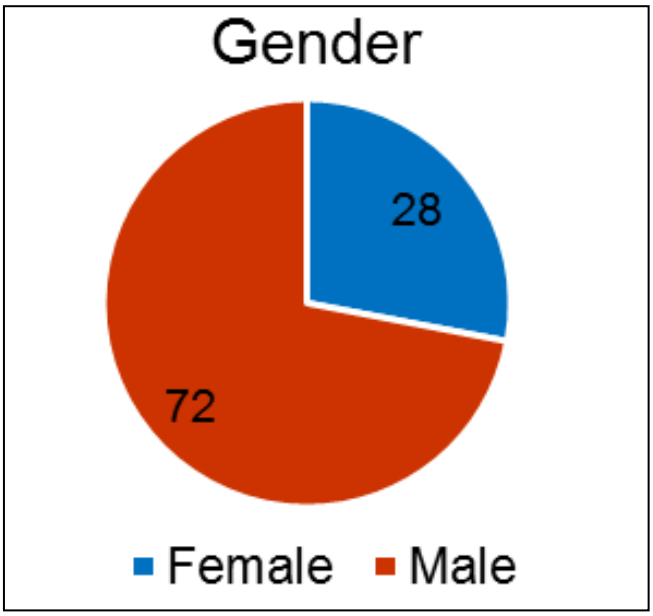

Fig 2: Gender percentage

Out of 50 patients 36 were males and 14 were females, which signifies a male preponderance (figure 2).

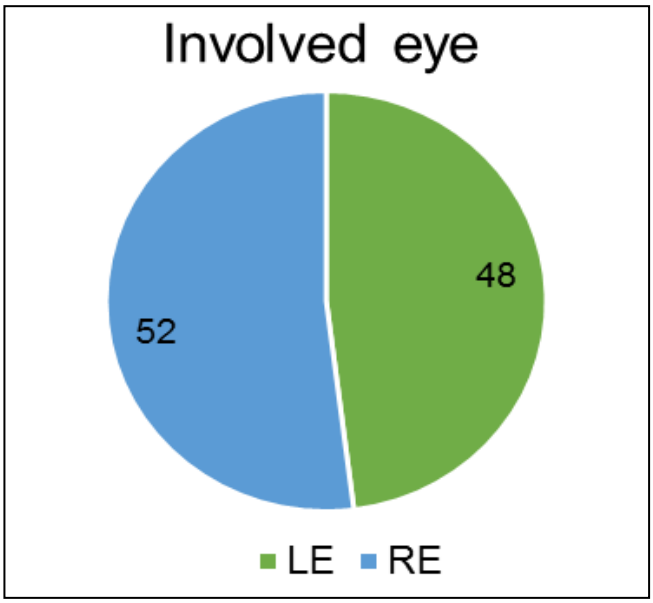

Fig 3: Patients involvement of both eye

Most of the patients had the involvement of right eye (52%). (Figure 3)

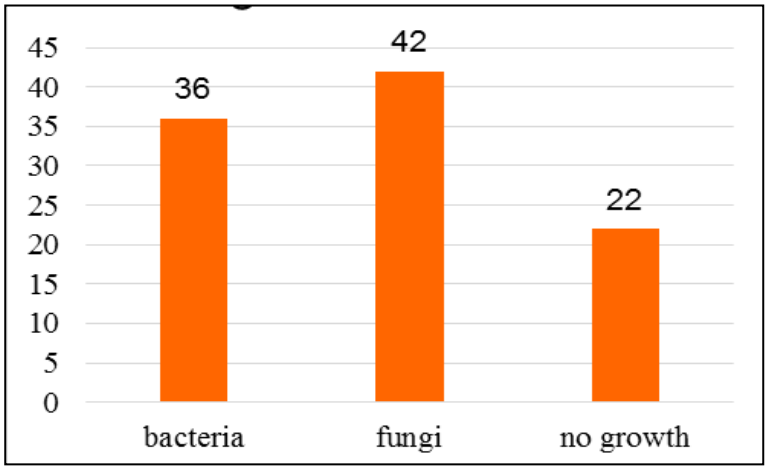

Fig 4: Organism isolated

Majority (80%) of patients had history of ocular trauma as the predisposing factor. Microbial etiology was established in 39 cases (78%). out of fifty patients with microbial keratitis, 42% had fungal etiology, 36% had bacterial etiology and 22% had no growth (figure 4).

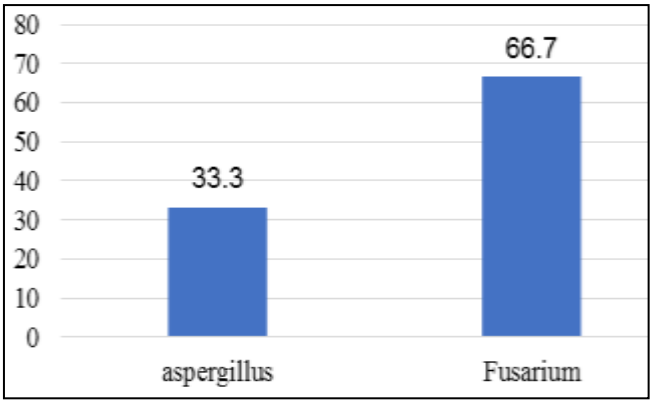

Fig 5: Type of fungi isolated

Fusarium (67%) is the most common fungal pathogen followed by Aspergillus (33%) (Figure 5).

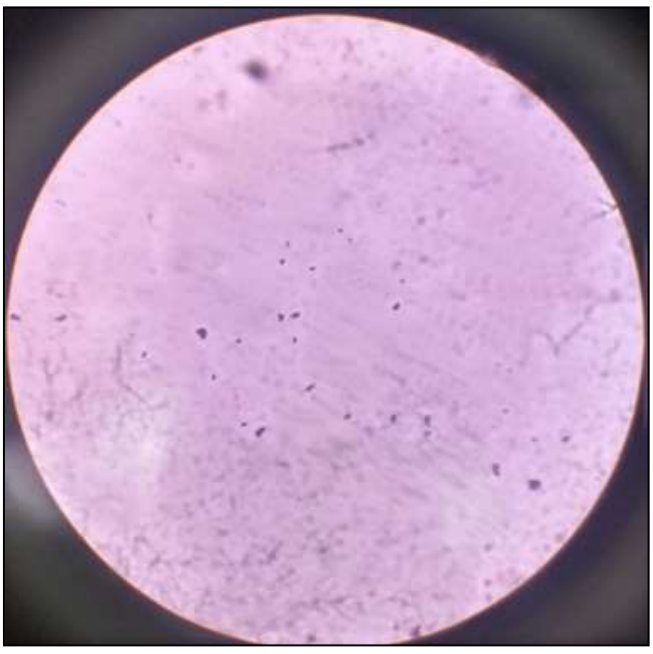

Fig 6: Photograph of KOH mount showing fungal spores

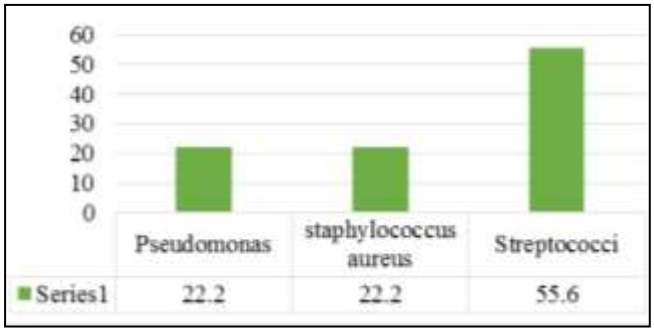

Fig 7: Type of bacteria isolated

Streptococci (55.6%) is the most common bacterial isolate followed by Staphylococci (22.2%) and Pseudomonas (22.2%) (Figure 7).

Discussion

In our study males (72%) are more commonly affected than the females (28%). Tewari *et al.* [3] in their study in 2011 reported that males (68%) are more commonly affected than females (32%) which is close to our study. Most of the patients had the involvement of right eye (52%). Arunga *et al.* [4] in 2019 in their study reported that males (56%) are more commonly affected than females, which is close to our study. Majority (80%) of patients had history of ocular trauma as the predisposing factor. Among them trauma with stick (26%) and paddy husk (14%) are the most common agents. Sharma, garg *et al.* [5] in 1999 from south india identified ocular disease (38.2%), previous ocular surgery (29.4%), trauma (17.6%) and severe systemic disease (16.7%) as the principal predisposing factor.

J.D. Chidambaram *et al.* [6] in 2018 from South India reported that history of corneal trauma present in 72% of them in their study. Basak *et al.* [7] in 2003 from Eastern India reported in their study that ocular trauma was the most common predisposing factor (82.9%) and among those with ocular trauma 43.9% had history of corneal injury with vegetable matter. Alex lap-ki Ng *et al.* [8] in 2015 from Hong Kong has reported in their study that contact lens was the commonest risk factor. Nikhil RP *et al.* [9] in 2019 reported that 64% of them are male and 52% were agriculture workers and 33% had trauma as the major predisposing factor followed by 10% had trauma plus chronic dacryocystitis, 4% had chronic dacryocystitis, 2% had trichiasis and 18 % had no predisposing factor. Out of fifty patients with microbial keratitis, 42% had fungal

etiology, 36% had bacterial etiology and 22% had no growth.

Ranjini CY *et al.* [10] in 2016 from Southern India reported in their study that fungal etiology (50%) is more common than bacterial (45%) etiology, which is similar to our study. Bajracharya *et al.* [11] in 2015 from Nepal also identified 54% had pure fungal growth, 43% had pure bacterial growth and 3% had mixed growth, which is also similar to our study. In contast, Gopinathan *et al.* [12] in 2001 from South India reported that 52% yielded bacterial, 39% were fungal, 2% acanthamoeba and 7.5% showed mixed growth. Srinivasan *et al.* [13] in 1997 from South India reported in his study that fusarium was the most predominant fungal isolate. Ranjini C Y *et al.* in 2016 from South India reported that fusarium was the most common fungal pathogen followed by aspergillus. Suwal *et al.* [14] in 2014 from Nepal also reported fusarium as the most common fungal pathogen. M J Bharathi *et al.* [15] in 2006 from Tamil Nadu also reported that fusarium is the most common organism followed by aspergillus. Above studies and our present study are similar.

In contrast Laila Aktar *et al.* [16] in 2009 from Bangladesh and Chandrakanth reddy *et al.* [17] in 2019 from South India reported that aspergillus is the most common isolate followed by fusarium. Present study shows streptococcus species is the predominant bacterial isolate followed by staphylococcus and pseudomonas in equal numbers. M J Bharathi *et al.* in 2006 from Tamil Nadu reported that streptococcus pneumoniae is the most common organism followed by staphylococcus aureus. Evelyn C *et al.* [18] in 2014 from Australia has reported that most common organisms identified are Streptococcal species (33%), Pseudomonas aeruginosa (30%), and Staphylococcus aureus (22%). These studies are similar to our present study. In contrast Y W Ibrahim *et al.* [19] in 2009 from London and Anil kumar *et al.* [20] in 2011 from Gujarat reported staphylococcus species as the most common bacterial pathogen.

Conclusion

Fifty cases were analysed in our study in relation to the clinical and microbiological diagnosis as well as their response to the treatment. Patients having chronic ocular conditions such as dry eye syndrome, severe blepharitis, chronic dacrocystitis, should be fore warned and closely monitored for the development of corneal ulceration.Corneal disease often leave permanent opacities, which will eventually diminish visual acuity and may even lead to complete loss of vision. Hence early diagnosis and appropriate treatment and strict adherence to the treatment and follow up will prevent corneal blindness due to microbial keratitis.

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