

Epidemiological Aspects and Microbiological Profile in Patients with Infectious Keratitis

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Abstract: *Background:* Corneal ulcer is one of the important ophthalmic conditions causing significant morbidity especially in the developing countries. This study was carried out to evaluate the common etiological agents, predisposing factors, age, gender of the cases. *Methods:* 20 patients attending the ophthalmology department of AL Ameen Medical college between April 2023 to September 2023 diagnosed with corneal ulcer were subjected to microbiological intervention. *Results:* Corneal ulcers were common in males than females. The mean age was 55 yrs. Ocular trauma was the most common cause of the corneal ulcer. Most of the cases were mild to moderate. Most common etiological agent was Fungus in 60% of the cases and Bacterial in 40% of the cases. *Aspergillus* being the most common etiological agent. *Conclusions:* This study has revealed that corneal ulcers are caused by both bacterial and fungal agents with fungal preponderance in this geographical area. Early and accurate diagnosis and intensive treatment is the need of hour for saving the eye and preventing the catastrophe of lifelong blindness.

Keywords: Corneal ulcer, Corneal scraping, Culture, Ocular trauma

1. Introduction

Central corneal ulceration is a major cause of monocular blindness in developing countries. Surveys in Africa and Asia have confirmed this finding,¹⁻⁶ and a recent report on the causes of blindness worldwide consistently lists corneal scarring second only to cataract as the major aetiology of blindness and visual disability in many of the developing nations in Asia, Africa, and the Middle East.⁷

The epidemiological pattern of corneal ulceration varies significantly from country to country and even from region to region. In order to develop a comprehensive strategy for the diagnosis, treatment, and ultimately for the prevention of corneal infections, the aetiological factors predisposing to ulceration and the pathogenic organisms which are responsible must be determined. Answers to these questions are crucial if a programme of prevention is to be considered and if appropriate therapeutic measures are to be instituted.⁸ Several investigators have reported the prevalence of bacterial and fungal pathogens isolated from ulcerated corneas.

But till now there has not been a population based study demonstrating the true incidence of microbial keratitis.⁸ Gonzales et al, have recently completed a study which documents the incidence of corneal infections in Madurai District, south India, and estimated an incidence of 11.3 per 10 000 population and 44% of all central corneal ulcers are caused by fungi.⁹ Similar studies Nepal (17%)¹⁰, Bangladesh (36%)¹¹, Florida (35%)¹².

The purpose of this study was to evaluate all of the infectious central corneal ulcers seen at Al Ameen Medical college, Vijayapura, south India, over a period of 6 months from April 2023 to September 2023. We documented the factors predisposing to the onset of corneal ulceration and identified the specific organisms responsible for infection.

2. Methods

20 patients attending the ophthalmology dept of AL Ameen Medical college between April 2023 to September 2023 diagnosed with corneal ulcer were subjected to microbiological intervention. Ulceration was defined as a loss of the corneal epithelium with underlying stromal infiltration and suppuration associated with signs of inflammation with or without hypopyon.

Inclusion criteria: All patients with presumed infectious corneal ulcer.

Exclusion criteria: Patients not willing to give consent, Ulcers involving the periphery of cornea, Typical viral ulcers and healing ulcers were excluded as were Mooren's ulcers, marginal ulcers, interstitial keratitis, sterile neurotrophic ulcers, and any ulcers associated with autoimmune conditions.

A standardized form was filled out on each patient documenting sociodemographic information as well as clinical information including duration of symptoms, previous treatment, predisposing ocular conditions, and associated risk factors.

3. Procedures

After a detailed history and clinical examination the patient was subjected to protocol of investigations.

Slit - lamp examination. The size of the epithelial defect after staining with fluorescein was measured with the variable slit on the biomicroscope and recorded in millimetres on a standardised form. In similar fashion the size and depth of the stromal infiltrate was recorded. A sketch of each ulcer was also drawn on the form using standardised frontal and cross sectional diagrams, and the presence or absence of a hypopyon was recorded and the height measured in millimetres. Associated ocular conditions such as blepharitis, dacryocystitis were noted.

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After detailed ocular examination, Corneal scrapings collected from the leading edge of the ulcer under aseptic condition with a no - 15 blade, directly on surface of solid media. Corneal scrapings were also smeared on slides for KOH mount, Grams stain.

Laboratory procedures -

- All inoculated media incubated aerobically at 37 *C, and evaluated at 24 hrs and 48 hrs and later discarded if no growth.
- The sabourads dextrose was inoculated at 27* C and discarded at 3 wks if no growth.
- The inoculated non - nutrient agar for Acanthamoebaspecies was discarded at 24 hrs if no growth.

Cultures were considered **positive** if, a growth of same organism is demonstrated on two or more solid media on C - streak, same organism grown from repeated scraping, smear results consistent with cultures and clinical findings.

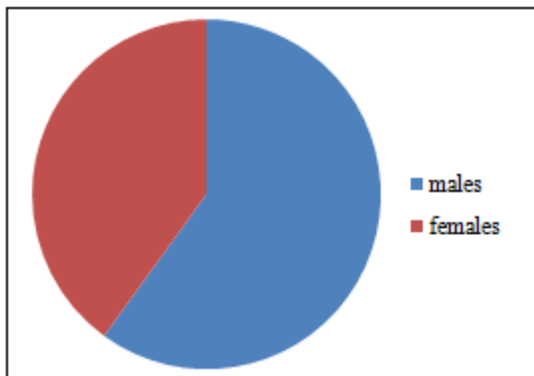
4. Results

Age: mean age was 55 years.

Age	Minimum	Maximum	Mean
Age	25	65	55

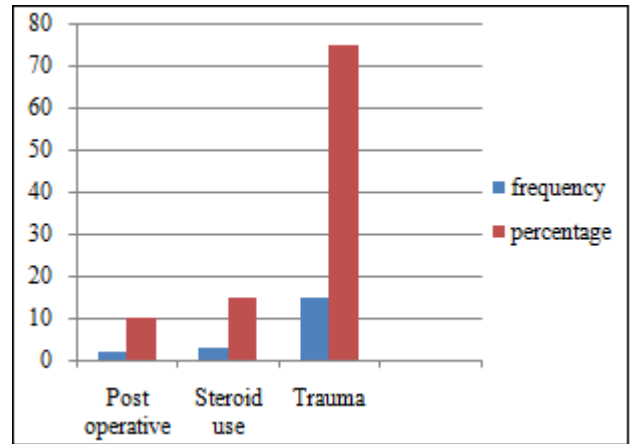
Gender: Males were affected more than females.

	Frequency	Percentage
Males	12	60%
Females	8	40%
Total	20	100%



Predisposing Factor -

	Frequency	Percentage
Post operative	2	10%
Steroid use	3	15%
Trauma	15	75%
Total	20	100%

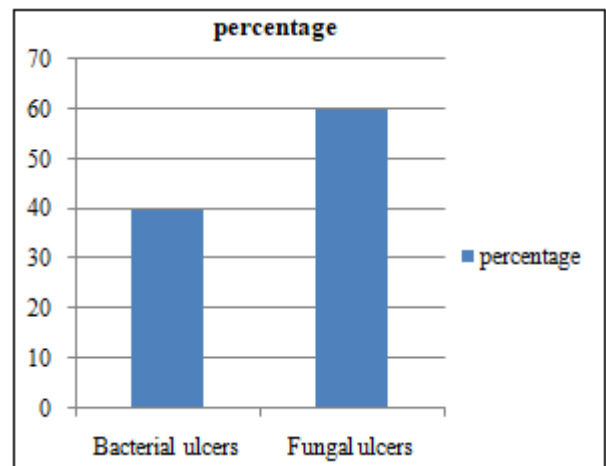


Trauma was the most common predisposing factor for corneal ulcer in these areas.

Clinical diagnosis

	Frequency	Percentage
Bacterial ulcers	8	40
Fungal ulcers	12	60
Total	20	100

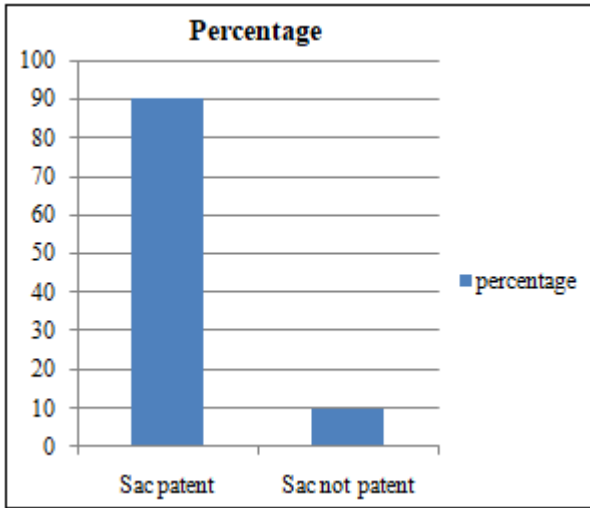
Fungal ulcers were most common Clinical diagnosis.



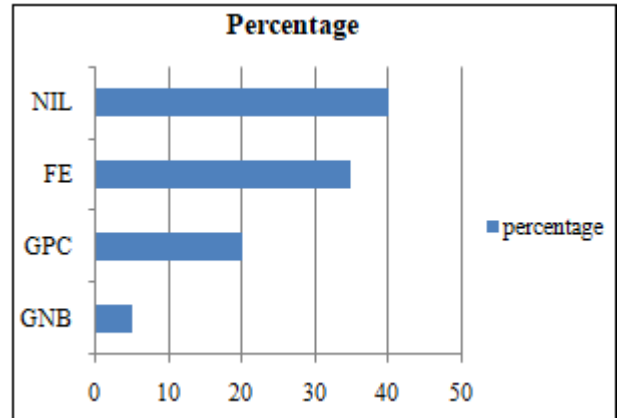
Sac -

Sac	Cases	Percentage
Patent	18	90
Not patent	2	10
Total	20	100

In 10% of cases the sac was not patent.



Gram staining report -



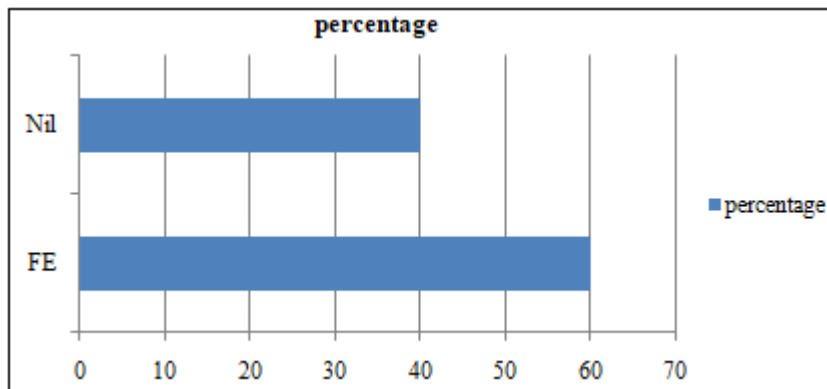
FE - Fungal elements GPC - gram positive cocci GNB - gram negative bacilli

	NIL	FE	GPC	GNB
Percentage	40	35	20	5

KOH mount -

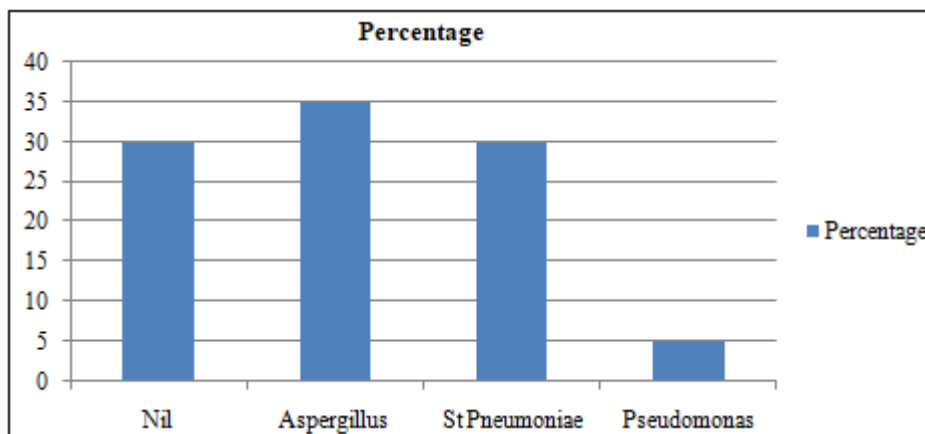
12 cases (60%) of cases were positive for fungal elements.

	Frequency	Percentage
Fungal elements	12	60
nil	8	40
total	20	100



FE - Fungal elements

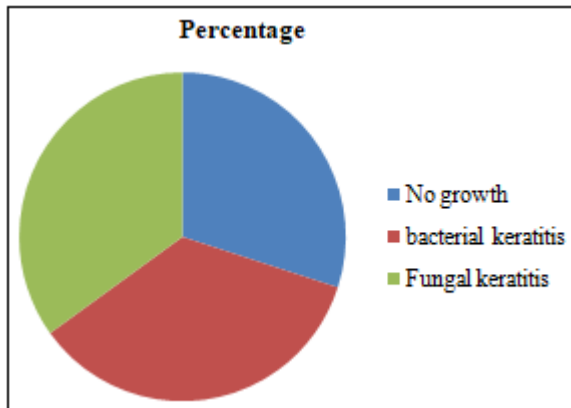
Microorganism isolated -



The most common micro organism isolated is Aspergillus followed by streptococcus Pneumoniae.

Culture proven -

	Culture Proven	Percentage
Bacterial keratitis	7	35
Fungal keratitis	7	35
Culture showing no growth	6	30

**5. Discussion**

A variety of factors determine the 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.

20 patients attending the ophthalmology department of AL Ameen Medical College between April 2023 to September 2023 diagnosed with corneal ulceration were included and subjected to microbiological intervention.

The mean age that was affected was 55 years in our study. Usually people in middle ages are more affected as it is the age where most of them are physically active and have higher risk of corneal injury. There was male preponderance in our study and the ratio of male to female was 1.5: 1 and it is almost similar to Srinivas *et al*⁸ {1.6: 1} and Gonsalves *et al*⁹.

The most common cause was Trauma with vegetative matter - 8 (40%) followed by Previous ocular surgery - 2 (10%) and Steroid use - 2 (10%).

On the basis of signs and symptoms, clinical diagnosis of Fungal ulcer was made in 12 (60%) cases, Bacterial in 8 (40%) cases.

On Gram staining, 12 (60%) were positive for Gram staining, out of which 7 (35%) were positive fungal elements, 4 (20%) positive for Gram positive cocci, 1 (5%) for Gram negative bacilli. In a study conducted by Lv Prasad Eye Institute, sensitivity of Gram staining was found to be 40%.

The collective culture proven bacterial cases were 7 (35%) of which Pneumoniae followed by Pseudomonas.

Culture proven fungal cases were 7 (35%) of which Aspergillus was predominant.

Thus there was an equal incidence of fungal and bacterial keratitis in this study.

Bacterial keratitis was predominantly caused by Streptococcus Pneumoniae

Total culture proven fungal cases were 7 (35%) out of which 4 (20%) cases showed Aspergillus growth. A high prevalence of fungal keratitis caused by filamentous fungi in warmer climate is reported. Similar reported incidence in other regions of India is 7.3 % in North India¹³, 32% in East India¹⁴, 39.8% in West India¹⁵. Almost half (46.8%) of all corneal ulcers with positive cultures were fungal in origin. In the culture proven fungal cases the most common cause was injury due to vegetative matter. The sensitivity of Grams staining was 100% in detection of culture proven bacterial cases. The sensitivity of 10% KOH preparation was higher than Gram stain in detection of fungal filaments. The most common fungal pathogen isolated was Aspergillus where as in Madurai it was Fusarium⁸.

6. Summary and Conclusion

Epidemiological pattern vary from one country to other and in different geographical areas in same country.

Males are more prone to develop corneal ulcer than females, as they are involved more in outdoor activities. Trauma is the most common cause of corneal ulcer and most of fungal ulcers are because of trauma due to vegetative matter.

The incidence of Fungal and Bacterial ulcer is same in this study. Higher incidence of fungal ulcer may be due to agricultural activities in this region. Staining efficiently establishes the diagnosis therefore can be used in the management of corneal ulcer to start the prompt treatment as corneal ulcer is a medical emergency.

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