

Clinico-Epidemiological Aspects of Infectious Keratitis: An Observational Study

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ABSTRACT

Background: Keratitis is a condition in which the eye's cornea, the clear dome on the front surface of the eye, becomes inflamed. The aim of the study is to know the epidemiology and clinical aspects of the disease.

Methods: This observational study was done on fifty patients for a period of one year who were diagnosed with corneal ulcer. Patients were informed about the study and written consent was taken. Proper history was taken and detailed examination was done.

Results: The epidemiological patterns vary from one country to the other and in different geographical areas in the same country. Males are more prone to corneal ulcers than females as they are more involved in outdoor activities. Trauma is the leading cause for the corneal ulcers and most of the fungal ulcers are because of trauma due to vegetative matter. The incidence of the bacterial & fungal keratitis is almost the same in this area. The higher incidence of fungal ulcers may be related to the agricultural activities and the environmental conditions.

Conclusion: 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. The microbiological profile helps the ophthalmologists to start the specific treatment directed against the causative organisms.

Keywords: Bacterial, Fungal, Infection, Keratitis.

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INTRODUCTION

Keratitis is a condition in which the eye's cornea, the clear dome on the front surface of the eye, becomes inflamed. The condition is often marked by moderate to intense pain and usually involves any of the following symptoms: pain, impaired eyesight, photophobia (light sensitivity), red eye and a 'gritty' sensation.¹⁻⁴ On the basis of micro-organisms, the keratitis is divided into:

a) Viral: Herpes simplex keratitis (dendritic keratitis). Viral infection of the cornea is often caused by the herpes simplex virus which frequently leaves what is called a 'dendritic ulcer', Herpes zoster keratitis, associated with Herpes zoster ophthalmicus, which is a form of Shingles,⁵ b) Bacterial: Bacterial infection of the cornea can follow from an injury or from wearing contact lenses. The bacteria involved are Staphylococcus aureus and for contact lens wearers, Pseudomonas aeruginosa. Pseudomonas aeruginosa contains enzymes that can digest the cornea,⁶ c) Fungal, d) Amoebic: (Acanthamoeba keratitis) Amoebic infection of the cornea is a serious corneal infection, often affecting contact lens wearers. It is usually caused by Acanthamoeba. On May 25, 2007, the CDC issued a health advisory due to increased risk of Acanthamoeba keratitis (AK) associated with use of Advanced

Medical Optics (AMO) Complete Moisture Plus Multi-Purpose eye solution,⁷ e) Parasitic: Onchocercal keratitis, which follows O. volvulus infection by infected blackfly bite. These blackfly usually dwell near fast-flowing African streams, so the disease is also called "river blindness".⁸

Treatment depends on the cause of the keratitis. Infectious keratitis can progress rapidly, and generally requires urgent antibacterial, antifungal, or antiviral therapy to eliminate the pathogen. Antibacterial solutions include levofloxacin, gatifloxacin, moxifloxacin, ofloxacin. It is unclear if steroid eye drops are useful or not. In addition, contact lens wearers are typically advised to discontinue contact lens wear and replace contaminated contact lenses and contact lens cases. (Contaminated lenses and cases should not be discarded as cultures from these can be used to identify the pathogen).⁹ Acyclovir is the mainstay of treatment for HSV keratitis and steroids should be avoided at all costs in this condition. Application of steroids to a dendritic ulcer caused by HSV will result in rapid and significant worsening of the ulcer to form an 'amoeboid' or 'geographic' ulcer, so named because of the ulcer's map like shape.¹⁰

For the purpose of this symposium, the term "keratitis" implies suppurative nonviral and viral keratitis. In general, keratitis could be infective and noninfective. Differentiating between them is crucial in managing both. Careful clinical examination, aided by laboratory investigations, could help in correct diagnosis and proper management.¹¹⁻¹⁵

Even though both conditions may involve all age groups, infective keratitis occurs more frequently in children and adults. To describe precisely the ocular features of these conditions, the clinician must be well trained in slit-lamp biomicroscopy. Other magnifiers like loupes and spectacles may not reveal the depth of the lesion and other associated clinical signs.¹⁶ Infective and non-infective keratitis may overlap each other. Non-infective keratitis may become infective by pathogenic or non-pathogenic microbes and may result in sight-threatening complications. Infective keratitis could also be suppurative and non-suppurative. Suppurative keratitis is frequently caused by bacteria and fungi. Non-suppurative infective keratitis could be viral, spirochaetal, parasitic or immune-related stromal necrosis.¹⁷⁻²⁰

MATERIALS AND METHODS

This observational study was done on fifty patients for a period of one year, attending ophthalmology OPD & diagnosed with corneal ulcer. Patients were informed about the study and written consent was taken. Proper history was taken and detailed examination was done.

Inclusion Criteria

All patients with presumed infectious corneal ulcer attending ophthalmology department.

Exclusion Criteria

1. The patients who are not willing to give consent for investigations
2. The patients with corneal ulcer involving peripheral cornea.

Table 1: Age Distribution.

| Age of patient (years) | N | Minimum | Maximum | Mean | Std. deviation |
|------------------------|----|---------|---------|-------|----------------|
| | 50 | 8 | 70 | 45.80 | 15.61 |

Table 2: Type of accompanying chronic dacryo-cystitis.

| Sac patency | Frequency | Percent |
|-------------|-----------|---------|
| Non patent | 4 | 8.0 |
| Patent | 46 | 92.0 |
| Total | 50 | 100.0 |

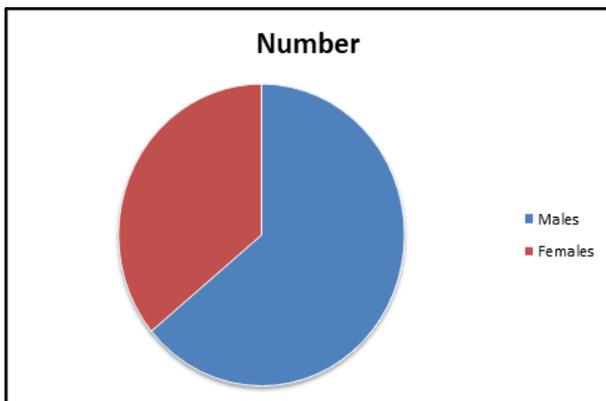


Fig 1: Gender distribution.

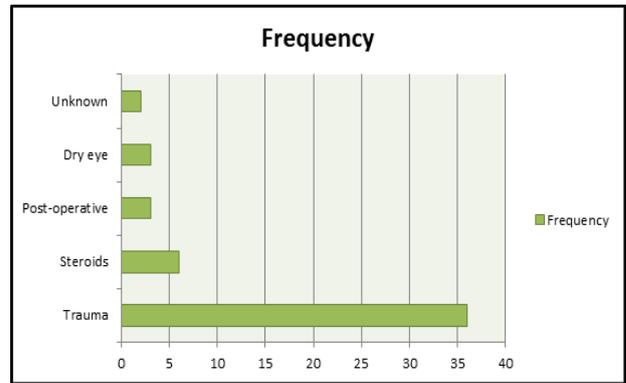


Fig 2: Aetiology of disease.

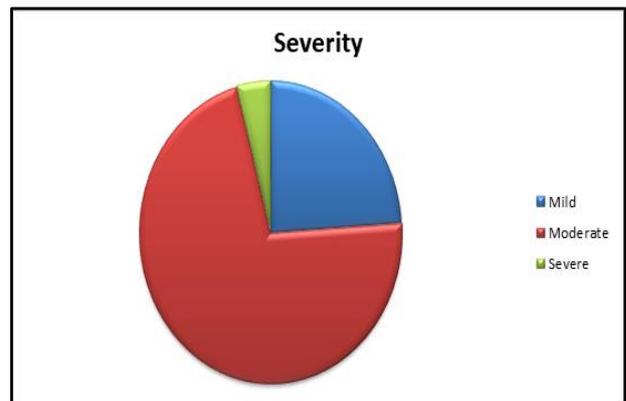


Fig 3: Frequency of grading of severity.

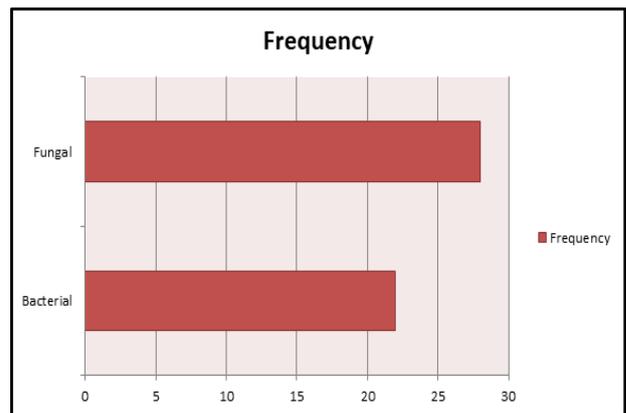


Fig 4: Frequency of micro-organism aetiology.

RESULTS

The study was done on fifty patients for a period of one year. The mean age of the study population was 45.80 years [Table 1].

The incidence of disease was higher in males as compared to females. 64% of population was of males [Figure 1].

Trauma was the leading cause for the infectious keratitis followed by the use of steroids topically. In case of two patients, no aetiology was found [Figure 2].

48% of subjects had moderate grading of severity followed by 36% (mild) and 16% (severe) grading [Figure 3].

56% of cases had fungal aetiology followed by bacterial cause in 44% of cases [Figure 4].

In 92% cases, naso-lacrimal duct is patent whereas in only 4 cases the duct is non-patent [Table 2].

DISCUSSION

All over the world, bacterial keratitis is more common than fungal keratitis, but this does not hold true for India and other tropical countries.⁹ In our country, the following risk factors have been identified as leading to corneal ulcer: trauma, xerophthalmia, measles, malnutrition, diarrhea, ocular surface problem, eyelid abnormalities and rarely contact lenses. Trauma to the cornea accounts for 60-68% of cases developing corneal ulcer.^{6,19}

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.⁹ Both sexes tend to develop corneal ulcers in the middle decades of life when presumably they are more physically active and at a higher risk for corneal injury. 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.²¹

Considering the predominant predisposing factor of trauma in all types of microbial keratitis (bacterial - 46.6%, fungal - 81.9%, *Acanthamoeba* - 95.5%) the probable reason for male preponderance is obvious. Ocular trauma was significantly more associated with outdoor occupation in this series.¹

Among the causative organisms for infectious keratitis, *Nocardia* is uncommon. Trauma with organic matter or dry soil is found to be the major predisposing factor. Typically, the ulcer runs a slow and protracted course. The lesion appears as a cracked windshield or resembling a group of pinhead-size yellowish white infiltrates arranged in a wreath-like fashion which is considered as the classic clinical picture. The ulcer remains superficial and may have associated hypopyon. The ulcer does not respond to conventional treatment.²² It is interesting to note that a majority of our patients presented within one week 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 one month to reach the hospital for treatment.¹¹ 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. The detection of fungi was much higher in the smears than it was for bacteria in our study.¹⁹

Fungal keratitis is more prevalent in tropical countries and frequently affects young rural men engaged in agriculture and other rural population. The incidence ranges from 35 to 50% in India. Keratomycoses most often picks up healthy cornea exposed due to minor abrasions. Chronic ocular surface problem, steroid use, immunocompromised host, diabetics and contact lens wearers may rarely get fungal ulcer. In 2006, an epidemic of *Fusarium* keratitis was reported following the use of contaminated contact lens cleaner. In India, *Aspergillus* and *Fusarium* species are frequently isolated as causative agents.^{3,14,21}

CONCLUSION

1. Epidemiological patterns vary from one country to the other and in different geographical areas in the same country.
2. Males are more prone to corneal ulcers than females as they are more involved in outdoor activities.
3. Trauma is the leading cause for the corneal ulcers and most of the fungal ulcers are because of trauma due to vegetative matter.

4. The incidence of the bacterial & fungal keratitis is almost the same in this area. The higher incidence of fungal ulcers may be related to the agricultural activities and the environmental conditions.
5. 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.
6. The microbiological profile helps the ophthalmologists to start the specific treatment directed against the causative organisms.

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