

Etiology of Infectious Keratitis as Seen at a Tertiary Care Center in Larkana, Pakistan

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Purpose: To determine the different causes of infectious keratitis and their relative frequencies in the patients coming to a tertiary care center in Larkana, Pakistan.

Study Design: Prospective case series.

Place and duration of study: This study was carried out at the Department of Ophthalmology, Chandka Medical College Hospital Larkana, Pakistan, from February 2004 up till February 2015.

Material and Methods: The number of patients clinically diagnosed as case of infectious keratitis included in the study, were 2411. Patients excluded from the study were under the age of 16 years, or having Mooren's ulcer, or ulcers associated with exposure, autoimmune and systemic diseases. Corneal swabs or scrapings were taken and prepared on separate slides for microscopic evaluation of Bacteria, Fungi and Acanthamoeba; while the viral keratitis was diagnosed on clinical grounds. A standard proforma, including sex and age of the patient, clinical diagnosis and the results of corneal scrapings, was filled for each patient. SPSS version 20 was used for data entry and analysis.

Results: Out of the total 2411 patients, 60.02% were males and 39.98% were females. The mean age (\pm standard deviation) was 36.73 ± 15.49 years. The final report showed that the major cause of infectious keratitis were Bacteria with 56.12% of the total cases, followed by Fungi with 38.45%. Cases of Viral keratitis were 3.65% and 1.78% patients had Acanthamoeba keratitis.

Conclusion: Bacteria and Fungi are responsible for the bulk (94.57%) of infectious keratitis but Virus and Acanthamoeba should not be ignored or underestimated.

Keywords: Keratitis, Acanthamoeba keratitis, Eye Infections, Bacterial, Fungal, Viral.

Cornea is one of the most important and sensitive parts of the human eye as it contributes the majority of its refractive power and also provides a clear entrance to the light rays in the eye.¹ Cornea is privileged because of its transparency which depends mainly upon its avascularity,² dehydrated state, smooth surface epithelium and well organized stromal collagen fibers.³ Although cornea does not depend on oxygen provided by lungs through blood and takes oxygen from air directly,⁴ but this a vascularity makes it

vulnerable to a variety of infections because it is deprived of the usual defense mechanisms of the body in the form of circulating polymorphs, lymphocytes and antibodies. Although there is some protection for the cornea in the form of lysozyme, lactoferrin, IgA, lipocalin⁵ etc, but it is meager and the cornea acts like a tied prisoner in the face of pathogens when it is breached. Infectious keratitis is the most common cause of unocular blindness in the world⁶. In Pakistan corneal opacity is the second most common cause of blindness after cataract.⁷ Infectious or microbial

keratitis can be caused by a wide spectrum of organisms, including a huge variety of bacteria, fungi, viruses and parasites.⁸ A lot of variation is seen in the etiology and epidemiology of infectious keratitis from place to place⁹ and time to time, that's why it is essential to have local data available, so that the burden of problem is understood and preventive and curative strategies are planned and established. The objective of this study was to identify the different causes of infectious keratitis and their prevalence and frequencies in the patients coming to the Department of Ophthalmology, Chandka Medical College and Hospital Larkana.

MATERIALS AND METHODS

This was a prospective case series study carried out at the Department of Ophthalmology, Chandka Medical College Hospital Larkana, Sindh, Pakistan, from February 2004 up till February 2015. All patients attending the outpatient department, clinically diagnosed as a case of infectious keratitis and given informed consent were included in the study. Patients excluded from the study were under the age of 16 years, or having Mooren's ulcer, or ulcers associated with exposure, autoimmune and systemic diseases. Corneal swabs or scrapings were taken and the specimens were prepared on three separate slides, one was prepared with potassium hydroxide (KOH 10%) to see the fungal hyphae or pseudohyphae, the second stained with Gram's stain to identify the bacteria, and the third was stained with hematoxylin and eosin stain to look for Acanthamoeba. Slides were then seen under the microscope for evaluation and final report. A standard proforma was filled for each patient, which included gender and age of the patient, clinical diagnosis and the results of corneal scrapings except for the patients suspected of viral ulcers, in which case the diagnosis was clinical and considered definite if there was improvement seen on antiviral treatment. In case of polymicrobial infections if Acanthamoebae were identified then it was labeled as Acanthamoeba keratitis regardless of the results of the other two slides. If fungal hyphae were seen, it was labeled as fungal keratitis. Bacterial keratitis was only labeled if bacteria alone were seen. SPSS version 20 was used for data entry and analysis.

RESULTS

A total of 2411 patients were clinically diagnosed as having infectious keratitis and included in the study

during the period of eleven years, out of which 1447 (60.02%) were males and 964 (39.98%) were females (Fig. 1). The mean age (\pm standard deviation) was 36.73 ± 15.49 years and the range was 17 – 76 years. The final report after combining the results of corneal scrapings and clinical diagnosis showed that 1353 (56.12%) patients were fulfilling the criteria of bacterial keratitis. 927 (38.45%) patients had fungal keratitis, 88 (3.65%) patients were diagnosed as case of viral keratitis and 43 (1.78%) patients had Acanthamoeba keratitis (Fig. 2).

DISCUSSION

This study shows that males have a greater tendency to fall prey to infectious keratitis than females, which is consistent with other studies from Pakistan,^{8,12} Malaysia²⁴ and India.²⁰ This is probably due to greater

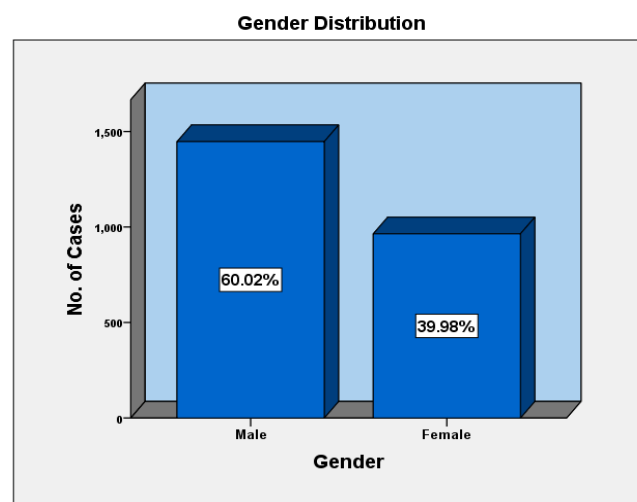


Fig. 1:

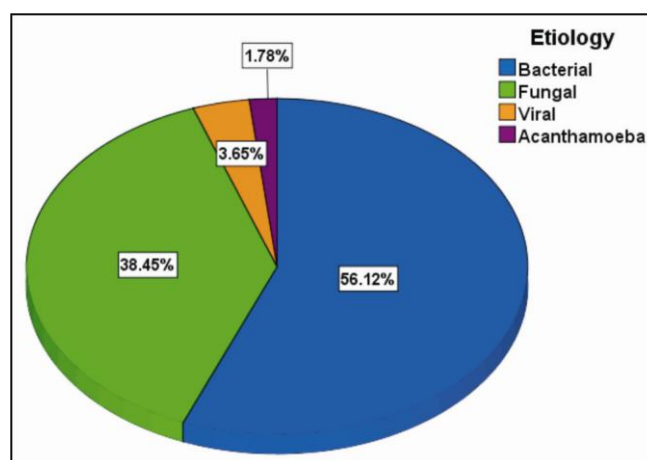


Fig. 2:

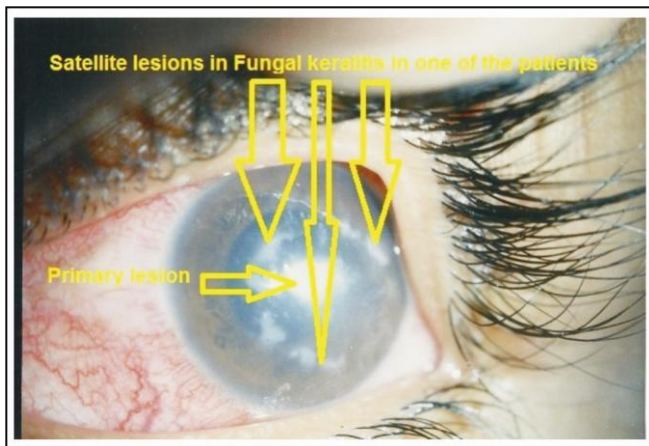


Fig. 3: Fungal keratitis.

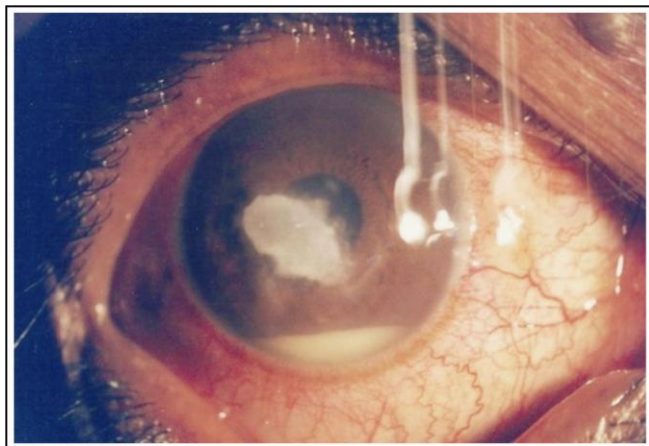


Fig. 4: Bacterial keratitis

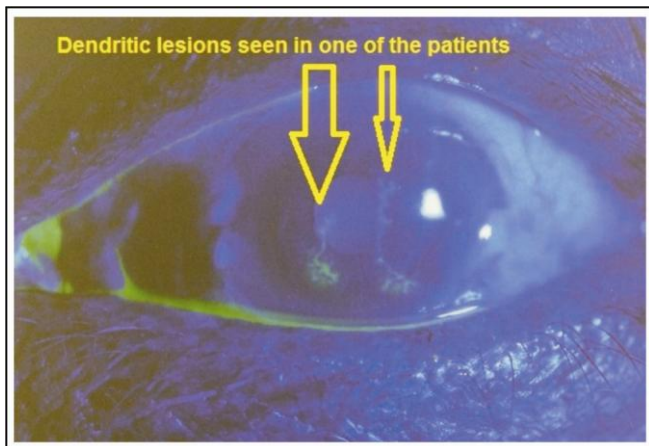


Fig. 5: Viral keratitis (Herpes simplex)

exposure of males to outdoor risk factors, physical activity and professional hazards. Patients in middle ages are more prone to develop infectious keratitis

according to our study, which is similar to the studies from Pakistan^{8,12} and India²⁰. The mean age being 36.73 ± 15.49 years which is lower than the mean age

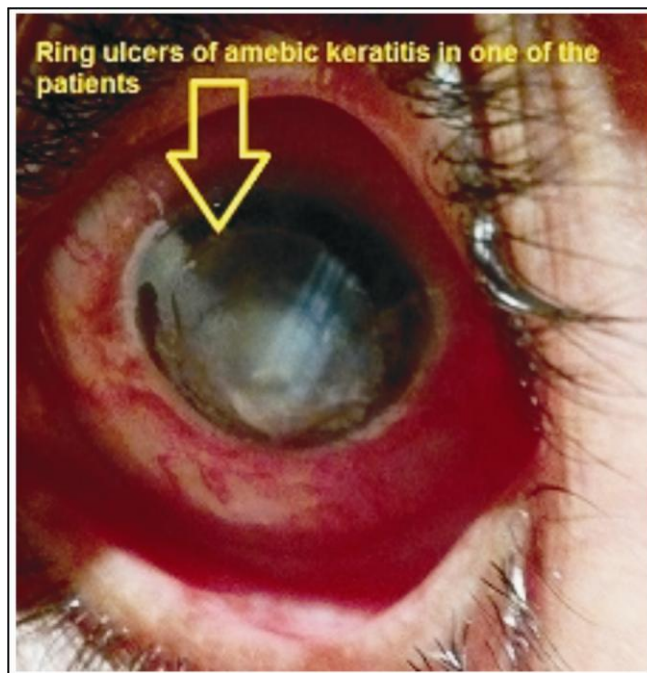


Fig. 6: Amebic keratitis.

(44.5 ± 20.9 years) reported by Norina TJ et al²⁴ and the mean age (64.3 ± 10.3 years) reported by Ahn M et al²². This study shows that bacteria are more common (56.12%) among the organisms causing infectious keratitis and it is consistent with some other research studies around the world^{8, 10, 11}, although, other studies have reported fungus as the major cause of infectious keratitis.¹²⁻¹⁵ Epidemiology of infectious keratitis varies with geography and climate but generally Gram-positive bacteria are more frequently recovered in temperate climatic regions¹⁶⁻¹⁸ and Gram negative bacteria and fungi in tropical or sub-tropical climates^{19, 20}. Stapleton F et al²¹ states that Fungi account for 5 – 40% of culture proven infections which is rather similar to our results of 38.45%. In our study the cases of viral keratitis were 3.65% less than that reported by Patel S et al²³ and that of Acanthamoeba keratitis (1.78%) were approximately equal to that reported by Srinivasan M et al²⁵ (1%) and less than that reported by Riaz Q et al¹² (8%).

CONCLUSION

Infectious keratitis is an economic and social problem of huge magnitude due to the fact that the affected

population is middle aged, males more than females who are actively involved in their household and national progress. Bacteria and Fungi are responsible for the bulk (94.57%) of infectious keratitis but Virus and Acanthamoeba may not be underestimated.

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