



KERATITIS IN FLOOD-A PERSPECTIVE VIEW.

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ABSTRACT

INTRODUCTION: Keratitis means inflammation of cornea. It can be infectious or noninfectious. Infectious causes include Bacteria, viruses, Fungi, causes varying in different parts of the world. **PURPOSE OF STUDY:** This study was conducted to evaluate the causes of Keratitis in flood affected areas in district Shaheed benazeerabad and surrounding districts. **MATERIALS AND METHODS:** This was a case control study, carried out in 500 patients attending eye OPD and having Keratitis from August 2022 to October 2022. Out of 500 patients 311 were females and 189 were males. Patients were grouped into two, group A, those patients who came from flood affected areas (n=250) and group B, those who came from other areas (n=250). All patients were examined on slit lamp by a single consultant and diagnosis was aided with scraping and culture where needed. The cause of keratitis was sorted out on the basis of clinical findings and laboratory investigations. **RESULT:** Out of 250 patients in group A having keratitis 106(42.4%) were due to adenovirus, 58(23.2%) were due to fungal infection, 54(21.6%) were due to herpes simplex, 29(11.6%) were due to bacterial infection, 2(0.8%) were due to Acanthamoeba and 1(0.4%) was autoimmune in origin. In group B, out of 250 patients having keratitis 112(44.8%) were due to bacterial infection, 98(39.2%) were due to fungal infection, 26(10.4%) were adenoviral origin, 12(4.8%) were due to herpes simplex and 2(0.8%) cases were autoimmune in origin. **CONCLUSION:** In flood disaster the behavior of keratitis cause was different than normal circumstances.

KEY WORDS: Keratitis, Flood, Infection.

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INTRODUCTION

Keratitis means inflammation of cornea. It can be infectious or noninfectious. Infectious causes include Bacteria, viruses, Fungi, and Protozoa while noninfectious cause is mainly autoimmune in origin. If not treated well keratitis can lead to irreversible corneal blindness. An estimated figure of 5-77% of blindness is due to corneal causes varying in different parts of the world¹.

Prevention and treatment of keratitis is not only responsibility of a clinical ophthalmologist but also community ophthalmologist. This is because right from diagnosis upto treatment each and every step is challenging for the clinician due to multiple factors which include delayed presentation, financial position, lack of compliance, quacks practices, environmental factors, nutritional deficiency, immune status and overcrowding etc.

For the diagnostics purpose keratitis cases need to be scraped and sent for staining with gram, giemsa, KOH and culture in media like chocolate agar, blood agar, anaerobic media and saborouds agar². Clinical presentation of keratitis should not be overlooked as specific features are associated with each cause. **Bacterial keratitis**, because of its high incidence and potential complications, is one of the most visually threatening ocular infection globally. Depending upon the demography the causative bacteria varies, the common bacteria includes staphylococcus, streptococcus, gonococcus and pseudomonas. Morphologically there are focal white infiltrates with stromal edema, descemet folds, and hypopyon³. **Adenoviral keratoconjunctivitis** can present as EKC (epidemic keratoconjunctivitis) or PCF (Pharyngoconjunctival fever), corneal involvement being common in former one⁴. Corneal involvement either occur in the form of punctuate keratitis or larger geographic erosion which is self limiting. In about 60% of cases multifocal subepithelial to stromal infiltrates appear after 14 to 21 days of acute infection and persist for a few

weeks to months or years^{5,6}. **Herpes simplex virus (HSV) keratitis** is the most frequent cause of blindness due to corneal disease in the United States and the most common source of infectious blindness in the Western world⁷. Primary ocular HSV infections being commoner in children and associated with a viral prodrome and characteristic periocular herpetic blisters. Reactivation factors include stress, illness, menses, immunosuppression, sun exposure, fever, and trauma. Keratitis in herpes involves active viral proliferation. The classic epithelial dendrite is the most common presentation of epithelial disease and stained by fluorescein. Dendritic epithelial defects may extend to become geographic ulcers in patients with reduced immunity or steroid overuse^{8,9}. Stromal keratitis due to herpes simplex is due to stromal antigen antibody complement reaction. The clinical picture is manifested by multiple sites of corneal haze with epithelial sparing due to stromal infiltration. In chronic cases neovascularization, lipid keratopathy and scarring may ensue. *Disciform keratitis/endothelitis* is a cell-mediated immune reaction that involves both endothelium and stroma. All cases of disciform do not have history of herpes infection. *Keratouveitis* in herpes may present isolated or associated with other form of diseases. Metaherpetic keratitis is characterized by either neurotrophic keratopathy or microbial superinfections¹⁰. **Fungal keratitis** is either caused by yeast like candida or filamentous like fusarium, aspergillus, cadosporium. Early signs of fungal keratitis are fine to course granular infiltrates in the anterior corneal stroma, feathery branching of the fungi into the stroma and inflammatory cells and protein in the aqueous humour. Etiology of Fungal keratitis includes immunosuppression, topical steroid therapy, vegetable matter injury, seen mostly in warm, humid climates. Fungal keratitis is a slowly progressive infection if compared with bacterial keratitis. Histopathologically, fungal hyphae are

often located deep in the stroma, surrounding Descemet membrane and are therefore more difficult to identify and culture without corneal biopsy. A polymorphous acute and chronic inflammatory cell infiltrate of the stroma is present^{11,12}. **Acanthamoebic keratitis** is a sight threatening infection of the cornea characterized by severe pain with photophobia, ring like stromal infiltrate, epithelial defect and lid edema. Acanthamoeba is a protozoa that inhabits in water, air, soil and dust. Early picture of acanthamoeba shows pseudodendrites and perineural infiltrates. Late features are ring abscess, stromal infiltrate and radial keratoneuritis^{13,14}. To reach a definitive diagnosis in keratitis, microbial procedures are very helpful where scraping and swab are sent for culture and staining. Gram stain and giemsa stain gives instant results, while blood agar, chocolate agar are used as culture media for bacteria and thioglycolate broth to culture aerobic as well as facultative anaerobic bacteria¹⁵. Herpes simplex keratitis is diagnosed by PCR test as well as immunofluorescence antibody assay. For fungal keratitis KOH stain is diagnostic, and saporouds agar is used as culture medium. Similarly Acanthamoeba keratitis can be cultured on inactivated e-coli while confocal microscopy is diagnostic¹⁶.

MATERIALS AND METHODS:

This study was carried out in the days of historical rains ever in sindh(442.8mm) in Aug/September 2022. The disaster of flood in that rain created many socioeconomical and health related issues. This case control study was carried out in patients who attended eye OPD and were diagnosed to have keratitis. They were 500 in number with 204 females and 296 males. Age of patient varied from 12 to 60 years. According to the areas which were effected in district shaheed benazeerabad and the surrounding districts like nosheroferoze, dadu, matiari and sanghar patients were grouped into A (Flood affected areas) = 250 and group B (other areas)= 250. Patients having keratitis secondary to

endopohthalmitis/ panopohthalmitis or impending corneal perforation were excluded. Detailed history and examination was carried out in OPD, with corneal staining and lab investigation like stain and culture were sent by scraping the cornea. After a definitive diagnosis patient's data was collected.

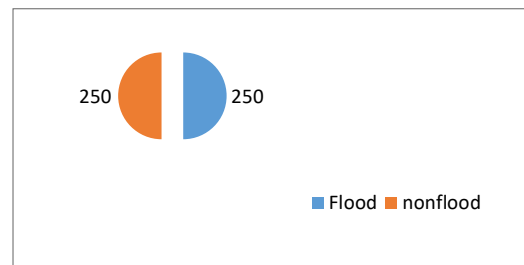


Fig.1: Distribution of patients

Result:

The study was carried out in 500 patients having keratitis with 250 being from flood affected areas and 250 from flood nonaffected areas. The average age of patient was 34 ± 6 years and gender wise male dominance as 296(59.2) being male and 204(40.8) female.

In the flood affected areas(Group A) the incidence of keratitis according to causative factor was as under:

| | |
|---------------------|------------|
| 1. Adenovirus | 106(42.4%) |
| 2. Fungal keratitis | 58(23.2%) |
| 3. Herpes simplex | 54(21.6%) |
| 4. Bacteria | 29(11.6%) |
| 5. Acanthamoeba | 2(0.8%) |
| 6. Autoimmune | 1(0.4%) |
| Total | 250 |

In flood non affected areas the incidence of keratitis according to causative factor was as under:

| | |
|---------------------|------------|
| 1. Bacterial | 112(44.8%) |
| 2. Fungal keratitis | 98(39.2%) |
| 3. Adenoviral | 26(10.4%) |
| 4. Herpes simplex | 12(4.8%) |
| 5. Autoimmune | 2(0.8%) |
| Total | 250 |

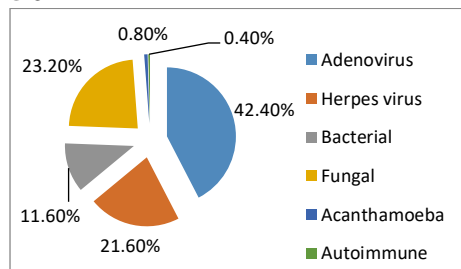


Fig 2: Distribution of Keratitis in Flood areas

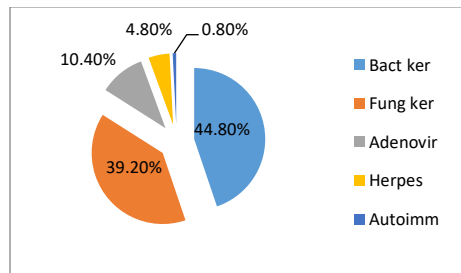


Fig 3: Distribution of Keratitis in Nonflood areas

DISCUSSION:

Keratitis is one of the major causes of irreversible blindness globally. The cause of keratitis varies according to the demographic status of the patient. In the European countries the commonest microbial cause of keratitis is bacteria¹⁷, while in Asian countries like India, studies report fungi as the commonest cause of keratitis¹⁸. Management parameters are set according to the causative factors. In Pakistan multiple studies have been carried out which have yielded as Bacteria and Fungi responsible for the bulk of infectious keratitis. According to a study by Shah SI et al¹⁹ on the basis of clinical and laboratory findings 56.12 % of patients yielded bacterial keratitis while 38.45% had fungal keratitis, 3.65% had viral keratitis, & 1.78% had Acanthamoeba keratitis.

Our district matching with our demographic data also has most of the keratitis with bacterial cause in the routine days. This statistics drastically changed in flood days, where our study showed adenovirus as the commonest cause of keratitis with Fungal being second one. In Flood disaster the number of cases of keratitis overall increased. Our study was aimed to find out any change in causative factors in these days so that guidelines can be set for the outgoing teams in the field well equipped

with the medications. This is because the usual relief camps focus on to bacterial keratitis and provide only antibacterial medications to patients. Following factors were hypothesized to be the cause of this change:

1. Migration to tents or open environment.
2. Use of contaminated flood water
3. Excessive exposure to sun light
4. Dietary shortage leading to starvation and so forth immune suppression
5. Trauma due to excessive exposure to open environment.
6. Lack of medical facilities at primary level.

CONCLUSION:

Disasters like flood change the most frequent causative factors of keratitis, thus changing the management plan for outreach medical teams for flood effectiveness becomes necessary.

ETHICS APPROVAL: The ERC gave ethical review approval

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin

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CONFLICT OF INTEREST: No competing interest declared.

REFERENCES

1. Whitcher JP, Srinivasan M, Upadhyay MP. Corneal blindness: a global perspective. Bulletin of the World Health Organization, 2001, 79: 214–21.
2. Shukla PK, Kumar M, Keshava GB. Mycotic keratitis: an overview of

- diagnosis and therapy. *Mycoses*. 2008; 51: 183-99.
3. Badenoch PR, Aggarwal RK, Coster DJ. Clostridium perfringens keratitis after penetrating keratoplasty. *Aust NZ J Ophthalmol*. 1995;23:245.
 4. Lee C.S., Lee A.Y., Akileswaran L., Stroman D., Najafi-Tagol K., Kleiboeker S., Chodosh J., Magaret A., Wald A., Van Gelder R.N., et al. Determinants of Outcomes of Adenoviral Keratoconjunctivitis. *Ophthalmology*. 2018;125:1344–1353.
 5. Butt A.L., Chodosh J. Adenoviral keratoconjunctivitis in a tertiary care eye clinic. *Cornea*. 2006;25:199–202.
 6. Dawson C.R., Hanna L., Togni B. Adenovirus type 8 infections in the United States. IV. Observations on the pathogenesis of lesions in severe eye disease. *Arch. Ophthalmol*. 1972;87:258–268.
 7. AAO *Basic and Clinical Science Course, External Disease and Cornea*, 2010-2011.
 8. Liesegang TJ, Melton LJ, 3rd, Daly PJ, Ilstrup DM. Epidemiology of ocular herpes simplex. Incidence in Rochester, Minn, 1950 through 1982. *Arch Ophthalmol* 1989;107:1155-9.
 9. Wang JC. Keratitis, Herpes Simplex. Emedicine. Accessed online from: <http://emedicine.medscape.com/article/1194268-overview>. Updated 8/7/2009.
 10. Herpetic Eye Disease Study Group. Acyclovir for the prevention of recurrent herpes simplex virus eye disease. *N Engl J Med* 1998; 339:300-6.
 11. Tena D, Rodríguez N, Toribio L, González-Praetorius A. Infectious Keratitis: Microbiological Review of 297 Cases. *Jpn J Infect Dis*. 2019 Mar 25;72(2):121-123.
 12. Saha R, Das S. Mycological profile of infectious Keratitis from Delhi. *Indian J Med Res*. 2006 Feb;123(2):159-64.
 13. Maycock NJ, ayaswal R, Update on Acanthamoeba Keratitis: Diagnosis, Treatment, and Outcomes. *Cornea*. 2016 May;
 14. Naginton J, Watson PG, Playfair TJ, McGill J, Jones BR, Steele AD, Amoebic infection of the eye. *Lancet (London, England)*. 1974 Dec 28;
 15. S.D *The role of smears, cultures, and antibiotic sensitivity testing in the management of suspected infectious keratitis* *Ophthalmology*, 103 (1) (1996), pp. 23-28.
 16. A. K. Boggild, D. S. Martin, T. Y. Lee, B. Yu, and D. E. Low, "Laboratory diagnosis of amoebic keratitis: comparison of four diagnostic methods for different types of clinical specimens," *Journal of Clinical Microbiology*, vol. 47, no. 5, pp. 1314–1318, 2009.
 17. Wong TY, Ng TP, Fong KS, Tan DT. Risk factors and clinical outcomes between fungal and bacterial keratitis: a comparative study. *CLAO J*. 1997;23(4):275–81.
 18. Basak SK, Basak S, Mohanta A, Bhowmick A. Epidemiological and microbiological diagnosis of suppurative keratitis in Gangetic West Bengal, eastern India. *Indian J Ophthalmol*. 2005;53(1):17–22.
 19. Shah SI, Shah SA, Abbasi PR, Fatima H, Soomro AA. Etiology of infectious keratitis as seen at a tertiary care center in Larkana, Pakistan. *Pakistan Journal of Ophthalmology*. 2016 Mar 31;32(1).