

Evaluation of risk factors, etiology and treatment outcome of infective keratitis in a tertiary care Centre in south Gujarat

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Conflicts of Interest: Nil

Abstract

Purpose: To study risk factors, etiology and treatment outcome of infective keratitis in a tertiary care Centre in South Gujarat.

Design: The study design was Prospective Study.

Materials and Methods: It was a prospective study which included patients coming to New Civil Hospital Surat from March 2021 to June 2022. The demographic details, risk factors, clinical examination, investigations and treatment outcome were analysed.

Results: A total of 40 patients were included in the study. Males were twice more commonly affected than females. The most common risk factor predisposing to keratitis was Trauma affecting 17 patients. Trauma with vegetative matter was most common (7 patients) followed by wooden stick, fingernail and rusted metal. Out of 40 cases of infective keratitis 15 were fungal, 11 bacterial, 10 viral and 4 had mixed etiology. Most

common bacterial isolate was *Pseudomonas Aeruginosa* (3 cases) followed by *Staphylococcus Aureus* and *Staphylococcus Epidermidis*. Amongst 15 cases of fungal keratitis 3 showed growth on SDA agar and 1 each of *Fusarium*, *Aspergillus* and *Candida* species were isolated. 43% of the patients presented to the tertiary care Centre after unsuccessful treatment and referral from peripheral health care centres.

Conclusion: Majority of infectious keratitis in our setup were fungal caused due to trauma in patients chiefly involved in field work.

Keywords: Infectious keratitis, Trauma

Introduction

According to World Health Organization (WHO), corneal diseases are among the major cause of vision loss and blindness following cataract and glaucoma. Microbial keratitis is a common, potentially sight-threatening ocular infection caused by bacteria, viruses,

fungi or parasites.¹ Fungi are the most common organism for microbial keratitis in China and India. Trauma is a common risk factor for fungal keratitis in developing agricultural countries.

whereas contact lens wear is the main risk factor for causing bacterial keratitis in developed countries. Cases of corneal ulcers are very common in developing country like India and South Gujarat being an agriculture dominant region the incidence of fungal corneal ulcer due to trauma are high. Therefore, it is necessary to start appropriate anti-microbial according to clinical diagnosis at the earliest possible time for better visual outcomes and to reduce sequelae of corneal ulcer.

Aim of this study was to provide the clinical with knowledge of risk factors, etiological agent and appropriate treatment modality for infectious keratitis and educate patient about the treatment outcome and need for early presentation and compliance to treatment.

Materials and methods

All patients above 18 years of age having microbial keratitis attending out patient department at New civil Hospital, Surat, South Gujarat from March 2021 to June 2022 were included in the study. Patients with non-infective conditions like degenerative, allergic or inflammatory keratitis and with autoimmune diseases were excluded.

A detailed history was taken. Distant and near visual acuity was assessed on Snellen's chart and Roman's chart respectively. First ocular adnexa were examined to rule out any infective foci. Sac syringing was done. Detailed corneal and anterior segment examination was done to determine size, shape, location, depth of ulcer, presence of hypopyon, vascularisation or scleral infiltration.

Corneal sensations were checked. Conjunctival swab and corneal swab/ scrapping was taken and sent to Microbiology department for staining, culture and antibiotic sensitivity reports. Systemic investigations were done which included hemogram and blood sugar testing.

Also in severe cases blood culture was sent to rule out presence of any systemic involvement. In cases where keratoplasty was done host corneal button was sent for microbiological examination for culture of microorganism and antibiotic sensitivity. Ent, Dental and Dermatological examination was done to rule out any infective foci. Patient was then treated with antimicrobial drugs based on clinical diagnosis. Reevaluation was done after a period of 24 hours. If patient had signs of regression like decrease in symptoms and signs like reduction in size of infiltration or hypopyon, consolidation of stromal infiltrate and decrease in anterior chamber reaction same treatment was given and meticulous regular follow up was done till epithelialization was complete or necrotic stroma was replaced by scar tissue.

However if patients showed signs of progression like increase in size of infiltrate, hypopyon, corneal thinning or impending perforation antimicrobial treatment was either changed on basis of culture sensitivity reports or switched to alternate antimicrobials. Cases not responding to our medical management were either planned for therapeutic or tectonic keratoplasty, glue with BCL, Conjunctival hooding or Tarsorrhaphy as per individual cases. Data was analysed and appropriate statistical test like Chi Square Test was applied to find association between etiological agent, occupation, residence and socioeconomic status of patient and the

causative agent. p- value was determined to evaluate level of significance. $p < 0.05$ was considered significant.

Results

Prevalence of microbial keratitis was more from of 18-57 years of age as this being productive age group of society was more prone to trauma leading to keratitis. Male: female ratio was 2.07:1 as males were more commonly involved in the outdoor activities. Incidence of microbial keratitis was more in the lower socioeconomic class (73% cases of bacterial keratitis and 67% cases of fungal keratitis) due to lack of awareness and careless aptitude towards seeking timely treatment. 83% of the cases of microbial keratitis belonged to the rural area which is statistically significant ($p=0.022$). 43% of the patients presented to the tertiary care Centre after unsuccessful treatment and referral from peripheral health care centres.

Trauma with vegetative matter and mud was the most common predisposing factor. Difference in causative agent on basis of traumatic agent is statistically significant ($p=0.014$). Majority of the cases of bacterial and fungal keratitis were moderate to severe while that of viral keratitis were mild in nature. Out of 11 cases of bacterial keratitis 6 were culture positive.

Pseudomonas was the most common isolate found in this study. 68% of the cases in our study responded well to medical treatment while 32% patients required surgical intervention. Majority of the cases healed with corneal opacity resulting in compromised vision.

Discussion

Highest cases of bacterial keratitis were noted in the age group of 38-47 years while Fungal keratitis was maximum in age group of 58-67 years.

The above results are in comparison with Srinivasan study et al² which showed 52.6% and 39.3% cases in

age group of 21-40 years and 41-60 years respectively. This is the socioeconomically active age group of the society which increases the incidence of trauma predisposing them to keratitis. In this study 27 cases i.e. 68% patients were male while 13 cases i.e. 32% were female. Male female ratio was 2.07:1.

Highest incidence of fungal keratitis was seen in lower socioeconomic class. 8 cases (73%) of bacterial keratitis and 10 cases (67%) of fungal keratitis belonged to socioeconomically lower group. In present study 33 cases i.e., 83% were from rural areas while 7 (17%) were from urban areas.

Out of 15 cases of fungal keratitis, 14 (93%) were from rural areas which lead to more chances of predisposition to trauma with vegetative matter. Prevalence of keratitis was high in rural population with p value of 0.022 which is highly significant. This is in correlation with Srinivasan study² where 70% of cases were from rural areas.

Field Labourers constituted 6 cases (40%) of fungal keratitis. Higher incidence of fungal keratitis in people associated with agricultural sector was also observed in previous studies. The results of our study are comparable to Srinivasan et al study (21.3%)² and Samar Basak study (11.3%)³. However, this value of fungal ulcer among field labour is not significant ($p= 0.121$) due to small sample size.

In our study majority of the patients (43%) were referred to our tertiary hospital after initial unsuccessful treatment at peripheral centres.

History of corneal trauma leading to corneal ulceration was the most frequent known predisposing factor noted representing 17 cases i.e. 5 cases (45%) of bacterial keratitis and 12 cases (80%) of fungal keratitis. Past

history of herpes was noted in 20% cases of viral keratitis.

The present result of ocular trauma being the most common predisposing factor was similar to Usha Gopinath et al study⁴ where 46.6% patients had bacterial keratitis and 81.9% patients had fungal keratitis.

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In our study 3 bacterial species were isolated. Most common was *Pseudomonas Aeruginosa* (3 cases -27%) followed by *Staphylococcus Aureus* (2 cases-18%) and *Staphylococcus Epidermidis* (1 case-9%). Out of 15 cases of fungal keratitis 7 were KOH positive but only 3 showed growth on Saburaoud's Dextrose Agar from which 1 each of *Aspergillus*, *Fusarium* and *Candida* species were isolated. India being a developing country fungus remains the leading cause of keratitis.

In this study, 68% of the cases were treated conservatively while 37% cases of bacterial keratitis, 40% of fungal keratitis and 20% of that of viral keratitis required surgical intervention.

Only 10% of cases in our study showed improvement in preliminary and final visual acuity while it remained the same in 70% of cases. Singh M, Gour A et al⁵ observed in their study that preliminary and final visual acuity had improvement of two lines in 35 eyes (43.7%), stayed the same in and worsened in 17 eyes (21%).

Conclusion

This study concluded that a significant proportion of our study population was involved in field work which increased their risk of trauma and lead development offungal keratitis.

Majority of patients in our study were managed medically owing to the use of effective topical antimicrobial drugs and knowledge of antibiotic sensitivity. However, the final visual outcome did not show significant visual improvement due to pupillary location of the ulcer.

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Table 1: Occupation-Based Distribution of Infective Keratitis.

Occupation	Bacterial		Fungal		Viral		Mixed		Total	
	%	Number	%	Number	%	Number	%	Number	%	Number
Field worker	63%	7	40%	6	0%	0	25%	1	35%	14
Factory worker	9%	1	20%	3	20%	2	0%	0	15%	6
Housewife	9%	1	27%	4	50%	5	50%	2	30%	12
Student	0%	0	0%	0	10%	1	0%	0	3%	1
Retired/desk work	18%	2	7%	1	10%	1	25%	1	12%	5
Driver	0%	0	7%	1	10%	1	0%	0	5%	2
Total		11		15		10		4		40

Table 2: Modes of Trauma as Risk Factor for Infective Keratitis.

Nature of injury	Bacterial	Fungal	Viral	Total
	Number	Number	Number	Number
Vegetative matter, mud	2	5	0	7
Wooden stick	0	3	0	3
Fingernail. Handkerchief	2	0	0	2
Rusted metal, tile	1	4	0	5
Total	5	12	0	17

Figure 1: Treatment Outcome.

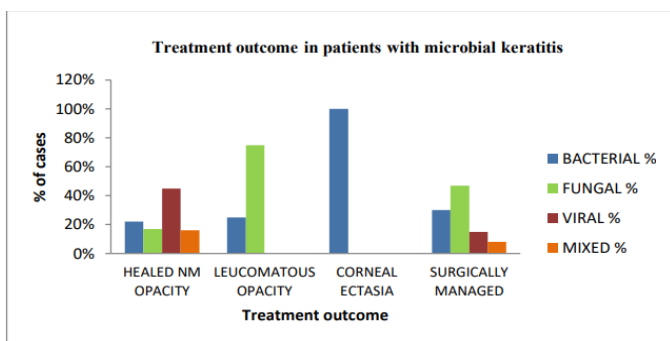


Figure 2: Comparison of Pre and Post Treatment Visual Acuity.

