

A Prospective Study of Epidemiological Features and Microbiological Diagnosis of Cases of Keratitis Attending Ophthalmology Department in a Tertiary Care Centre

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Abstract

AIM- To determine the epidemiological features and to find out the common causative organism in 50 cases of corneal ulcer.

Materials and Methods: A prospective study was carried out on 50 patients. Corneal swabs and scrapings were collected from all the patients. Direct examination of the sample was done by potassium hydroxide wet mount and gram stained smear and then inoculated onto blood agar, Mac Conkey agar and sabouraud' dextrose agar media. Identification of growth was done based on its macroscopic and microscopic features. Bacterial colonies were identified by Gram staining.

Results: Out of 50 cases of corneal ulcer, 74% cases were found to be culture positive in which fungi were more frequently isolated than bacteria .Staphylococcus aureus and Aspergillus spp were the most frequent bacterium and fungus.

Conclusion : S.Aureus and Aspergillus Spp were the most common isolate to be associated with corneal ulcer and the incidence was higher in males of rural population,

especially farmers, who were predisposed to vegetative matter injury.

Keywords: epidemiological, prospective, scrapings, Staphylococcus, Aspergillus

Introduction

Infective keratitis is a potentially sight threatening ocular condition and is a leading cause of monocular blindness^[1] .Corneal ulcers annually results in 1.2 to 2 million cases of corneal blindness globally with 90% of them occurring in developing countries. Corneal lesions were found to be responsible for 9% of all blindness in our country in a recent national survey by Government of India ^[2,3] .The common causes of blindness in India are cataract, refractive error, trachoma, malnutrition and injuries. Corneal ulcer has attained an important place in causing blindness 9% particularly in equatorial and tropical countries like India .The hot and humid climate along with the poor socio economic status, illiteracy, social taboos, ignorance, and malnutrition are responsible for corneal blindness ^[4] .

The majority of the cases are reported from rural areas who are dependent upon agriculture. Trauma may

breakdown normal defense mechanism and allow resident flora of conjunctiva to colonize damaged corneal tissue or pathogenic organisms are inoculated into eye at the time of injury. It has been one of the main ophthalmic problem as corneal ulceration can produce significant tissue destruction with threat of vision loss and potential corneal perforation^[5]

Corneal ulcer is most commonly caused by infection with bacterial, fungal, virus and parasites, other causes are abrasion, trauma or foreign bodies, inadequate eyelid closure, severe dry eyes, severe allergic eye disease and various inflammatory disorders. Contact lens wear, especially soft contact lenses worn over night may be a precipitating factor. Fungal keratitis can occur after corneal injury by vegetative matter or in immunocompromised people. Frequency of fungal keratitis has increased over the past years, especially with advent of corticosteroids therapy. The present study was undertaken to evaluate the epidemiology of corneal ulcer and to find out the common organisms causing corneal ulcers.

Materials and Methods

This prospective study was carried out on 50 clinical cases of corneal ulcer in department of Ophthalmology & Microbiology in a tertiary care centre in Central India. Study was executed after approved from the Institutional Ethical Committee. Specimens were processed for isolation and identification of all pathogens, according to the standard microbiological techniques.

Inclusion criteria:

- Patients of more than 18 yrs age of both sexes.
- All case with an overlying corneal epithelial defect with stromal infiltrate seen on slit lamp assisted examination.
- Patient give written consent to participate in study.

- Patients willing for regular follow up of 3 months.

Exclusion criteria

- Viral and protozoal keratitis.
- Refusal to participate in the study.
- Patients not willing for regular follow up.
- Patients not willing to comply with the prescribed treatment.
- Ulcer with Impending or actual perforation.
- Ulcer with near total corneal melting.
- Ulcer in healing stage with prior treatment.

Scrapings were performed under an operating microscope after instillation of proparacaine. Material from the corneal scraping was also smeared on three separate glass slides: One for Gram stain, One for Giemsa stain, the third for microscopic examination and KOH mount. Specimen obtained from scraping the leading edge and the base of each ulcer was inoculated directly onto blood agar, chocolate agar, sabouraud dextrose agar (SDA) Nutrient agar, Macconkey agar and into brain heart infusion broth. All smears were then sent to the laboratory for confirmation of causative agent of corneal ulcer and antibiotic susceptibility.

Result

A total of 50 corneal ulcer patients were included in the study. 28(56%) cases were male and 22(44%) cases were female. Maximum incidence of keratitis was observed in the age group of 40-60yrs. [Table 1] 40(80%) and 10(20%) cases belonged to rural and urban population respectively. In present study 36 (72%) cases were lower income group & remaining were from middle 12 (24%) and higher 02 (04%) income group[Table 2]. Trauma was found to be the most common predisposing factor for infective keratitis followed by chronic dacryocystitis and Diabetes Mellitus [Table 3].74% cases were found to be culture positive. 26% cases were found to be culture negative. Out of 37 bacterial organisms

cultured, 24(48%) were gram positive and 26 (52%) were gram negative.

22 (44%) cases were found to be fungal and 15 (30%) cases were found to have bacterial growth. Out of 22 cases of fungal growth, 14 cases were found aspergillus (28%), 6 cases fusarium (12%), 2 were found candida (4%). 15 cases were found to have bacterial growth, out of which 10 cases (20%) were found staphylococcus aureus, 2 cases (4%) were found staphylococcus albus, 3 cases (6%) were found streptococcus pneumonia. Rest 13 cases (26%) were found to be sterile.[Table 4]

Discussion

50 patients of corneal ulcer were enrolled in the present study of which fungal keratitis were found to be more common than the bacterial keratitis with maximum number of cases observed in the middle age group as they are physically more active and are at a higher risk for corneal injury.

In present study 56% cases were males and 44% cases were female. This finding correlates with the study done by **Dr K. Lakshmoji Naidu et al** which also showed male predominance. In present study maximum no of cases were from lower income group (72%), followed by middle income group (24%) and then higher income group (4%). Its in accordance with the findings of **Saurabh Patel, et al**. In our study 80% of cases were found to be from rural population whereas 20% cases were found to be from urban population. These findings correlated with study done by **Dr Ratnakumari et al**. Greater prevalence of all type of corneal ulcer in rural area may be due to the fact that persons are more ignorant towards health in rural areas. Approximately 38% cases found ocular trauma as a predisposing factor. Incidence of ocular trauma was reported from 52.8% to 66.6% by various authors like **Nithin Teja et al**, **Amani E Badawi et al**^[7].

Staphylococcus aureus and Aspergillus spp were the most frequently isolated bacterium and fungus. This finding is in accordance with study done by **Dr. Laltanpuia Chhangte et al**, **Amani E Badawi**. Higher prevalence of fungal keratitis were observed in farmer 63.63% due to their constant exposure to various types of vegetative injuries similar with **M. Jayahar Bharathi**^[6], **Suman Saha et al**, **Bandyopadhyay et al**, **Khare P et al**.

Conclusion

S.Aureus and Aspergillus Spp were the most common isolate to be associated with corneal ulcer and the incidence was higher in males of rural population, especially farmers, who were predisposed to vegetative matter injury.

References

1. Khare P, Shrivastava M et al. Study of epidemiological characters, predisposing factors and treatment outcome of corneal ulcer patients. January-February, 2014/ Vol 2/ Issue 1,33-39.
2. Dr. Laltanpuia Chhangte et al. Epidemiological and microbiological profile of infectious corneal ulcer in tertiary care center. International Journal of Scientific and Research Publications. February 2015; 5(2):1-5.
3. Sachin Deorukhkar, Ruchi Katiyar et al. Epidemiological features and laboratory results of bacterial and fungal keratitis: a five-year study at a rural tertiary care hospital in western Maharashtra, India. Singapore Med J 2012; 53(4): 264–26723.
4. Shashi Gandhi, DK Shakya, et al. Corneal Ulcer: A Prospective Clinical And Microbiological Study. International Journal of Medical Science and Public Health | 2014 | Vol 3 | Issue 11,1334-1337.
5. Dr K.Lakshmoji Naidu M.S (oph), Dr Bhavani, M.S.(Oph) et al. A Study On Clinical And Microbiological Evaluation Of Corneal Ulcers In GGH, Kakinada During 2013-2015. International

Journal of scientific research and management (IJSRM) | Volume 3 Issue 4 Pages 2564-2570 2015.

6. M. Jayahar Bharathi, R. Ramakrishnan. Microbial Keratitis in South India: Influence of Risk Factors, Climate, and Geographical Variation. Ophthalmic Epidemiology March–April 2007 ; 14:61-69.
7. Amani e badawi et al epidemiological, clinical and laboratory findings of infectious keratitis at mansoura ophthalmic center, Egypt Ind J Ophthalmol, vol. 10, no. 1, jan.18, 2017

Table 1: Distribution According to Age and Sex.

S.No	Age Group (in years)	Male		Female		Total	
		No of cases	%	No of cases	%	No of cases	%
1.	0-20yrs	0	0%	0	0%	0	0%
2.	21-40yrs	5	17.8%	7	31.8%	12	24%
3.	41-60yrs	20	71.42%	11	50.0%	31	62%
4.	61-80 yrs	3	10.7%	4	18.18%	7	14%
5.	81-100yrs	0	0%	0	0%	0	0%
	TOTAL	28	56%	22	44%	50	100%

Table 2: Distribution According to Socio Economic Status.

S. No	SOCIO-ECONOMIC STATUS	No of case	%
1	Lower income group	36	72%
2	Middle income group	12	24%
3	Higher income group	02	04%
	Total	50	100%

Table 3: Predisposing Factor for Corneal Ulcer.

Predisposing Factors	No. of patients	Percentage
Trauma	24	48%
Chronic dacrocystitis	6	12%
Contact lens	3	6%
Dry eyes	3	6%
Trichiasis	4	8%

&entropion		
Lagophthalmos	4	8%
Diabetes mellitus	6	12%
Total	50	100%

Table -4: Causative micro-organism

Type of organism	No. of Case	percentage
Aspergillus	14	28%
Fusarium	06	12%
Candida	02	04%
Staph. Aureus	10	20%
Staph. Albus	02	04%
Strepto. pneumonia.	03	06%
Sterile	13	26%

Table-5: Relation of occupation with causative organism.

S. No	Occupation	Total No. of cases	Causative organism					
			Bacteria		Fungus		Sterile	
			No.	%	No.	%	No.	%
1.	Farmer	22	3	13.63%	14	63.63%	5	22.72%
2.	Labourer	15	7	46.66%	5	33.33%	3	20%
3.	Other	13	4	30.76%	3	23.07%	6	46.15%
	Total	50	15	100%	22	100%	13	100%
								P= 0.04