Microbiological and Demographic Profile of Ulcerative Keratitis in a Tertiary Care Hospital in North Karnataka

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Abstract

Background: Corneal ulcers when untreated might result in scarring, visual loss, corneal perforation, endophthalmitis, and may require evisceration and hence knowing microbiological profile is of great importance which helps to prevent such complications

Aim: To describe demographic factors and microbiological profile of corneal ulcers which will help to improvise diagnosis and treatment

Methods: A cross sectional study was conducted for 1 year between January 2019 – January 2020 at a tertiary care hospital of Bagalkot, Karnataka. All the patients with corneal ulcers were asked detailed history, examined under slit lamp, scraping was done under slit lamp using 26 gauge needle and the collected sample was then inoculated on culture media and the organisms were identified from the colonies grown on culture media. Data was entered in excel sheet and results were expressed in numbers and percentages.

Results: Among 100 patients included in the study 62 (62%) were male 38 (38%) were female, 61 (61%) were farmers and 39 (39%) were non farmers, 48% showed presence of either bacterial or fungal elements on gram staining / KOH.47 (47%) were positive for culture out of which 9 (19.14%) were positive for bacterial growth and 38 (80.85%) were positive for Fungal growth. The most common bacteria isolated was streptococcus pneumonia (55.5%). The most common isolated fungus was fusarium species (84.21%).

Conclusion: Fungal corneal ulcers are most common in this region. Early detection and prompt treatment is important to minimize permanent visual loss. Preventive aspects like wearing glasses when required should be advised to the population.

Key-words: Keratitis; Corneal Ulcer; Fungal; Bacterial; KOH, North Karnataka

Introduction:

Corneal ulcer is the Breach in the continuity of the surface epithelium with a localized necrosis of the layers of the cornea. Corneal ulcer which is been recognised as a silent epidemic[1] can be caused by bacteria such as pseudomonous, staphylococcus aureus, pneumococcus, nisseriagonorohea, cornybacterium diphtheria or caused by fungus such as aspirgillus, fusuraium, or candida albicans in tropical countries, rural areas, immunocompromised individuals and in agricultural workers.

Corneal infections are a leading cause of ocular morbidity and blindness worldwide.[2] Corneal ulcer results in 1.5-2 million new cases of corneal blindness annually posing a major public health problem according to the world health organization (WHO) reports.[3]

Corneal ulcers when untreated might result in scarring, visual loss, corneal perforation, endophthalmitis, and may require evisceration and hence knowing microbiological profile is of great importance which helps to prevent such complications

Material and Methods:

A cross sectional study was conducted for 1 year between January 2019-January 2020 at tertiary

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care hospital Bagalkot, Karnataka. 100 patients with suspected corneal ulcer >12 year old were included in the study. All the cases with suspected viral keratitis, non infective traumatic corneal ulcer, ulcer due to burns, ulcers due to chemical injury, age<12 yrs were excluded from the study

Written consent was obtained from each participant, detailed history including name, age, residence, sex, occupation, mode of injury, DOV, pain, watering, discharge, ocular discomfort and treatment history was taken.

Detailed slit lamp examination was done to know the location, presence of foreign body, hypopyon, margins of ulcer and satellite lesions. Affected eye was then anaesthetized using 0.5% proparacaine topical eye drops. Ulcer margin and base of the ulcer was scraped using 26 gauge needle under slit lamp; collected scrapings were then smeared on glass slides for gram staining, KOH preparation and also directly inoculated on culture media including Mac Conkey agar, blood agar, chocolate agar and SDA and sent to microbiology laboratory within 30 minutes. Organisms were isolated from the colonies grown on the culture media.

Results:

Among 100 patients included in the study. 62% were males, 38% were females, 61% were farmers and 39% were non farmers, 59% belonged to class 2 socioeconomic status. More than 44 yr old were most affected (Table 1).

Table 1: Demographic profile of study participants with corneal ulcer

Variables	Frequency	
Age in years	13-33	37
	34-43	6
	44-53	20
	54-63	15
	64-73	10
	>74	12
Sex	Male	62
	Female	38
Occupation	Farmers	61
	Others	39
Socio economic status	Class 1	7
	Class 2	59
	Class 3	34

Microbial etiology was bacterial in 9% and fungal in 38% cases. 48% showed presence of either bacterial or fungal elements on gram staining/ KOH, 12 were positive for gram staining, 36 were positive for KOH (Table 2).

Table 2: Staining of corneal ulcer

Gram Staining	Gram positive	12
	Gram negative	88
KOH	Presence of Fungal elements	36
	Negative	64

47(47%) were positive for culture out of which 9 (19.14%) were positive for bacterial growth and 38 (80.85%) were positive for Fungal growth. The most common bacteria isolated were streptococcus pneumonia (55.5%) followed by pneumococcus (22.22%), enterobacter species (22.22%) (Table 3).

Table 3: Bacterial Pathogens isolated from patients with corneal ulcer

Bacteria	No. of isolates	Percentage (%)
Enterobacter	2	22.22%
Pneumococcus	2	22.22%
Streptococcus pneumoniae	5	55.56%
Total	9	100%

The most common isolated fungus was fusarium species (84.21%) followed by aspergillus species (10.5%) and curvularia species (5.26%) (Table 4).

Table 4: Fungal Pathogens isolated from patients with corneal ulcer

Fungi isolated	No. of isolates	Percentage (%)
Fusurium species	32	84.21%
Aspergillous species	4	10.52%
Curvularia species	2	5.26%
Total	38	100%

Discussion:

Demographic Profile: In this present study 62% were males, 38% were females which are in agreement with the study done by Amrutha kumara et al.[4] in which 61% of patients who developed corneal ulcers were males and 39% were females. 61% of our study subjects were farmers and 39% were non farmers which is in agreement with the study conducted by Gopinathan et al[5] in which patients with agriculture based activities were at 1.33 times greater risk of developing microbial keratitis. 59% belonged to low socioeconomic status which is similar to the study carried by Sunilkumar Biradar et al.[6]

Microbiological Profile: In this study 47% were positive for culture out of which 9 (19.14%) were positive for bacterial growth and 38 (80.85%) were positive for fungal growth. Our findings corroborates with other studies carried out at different centres. Study carried by Sunilkumar Biradar et al.[6] in north Karnataka reported 29.6% bacterial keratitis and 38.5% fungal keratitis. Amruta Kumari et al.[4] reported 67.17% bacterial and 25.37% fungal keratitis in south Karnataka. Gopinathan et al.[5] reported 51.9% bacterial and 38.2% fungal keratitis.

In the present study fungal etiology dominated the keratitis this could be due to the agriculture profession where they are mostly exposed to vegetative matter. We found that, the most common bacteria isolated were streptococcus pneumonia (55.5%) followed by Pneumococcus (22.22%), Enterobacter species (22.22%). Sunilkumar Biradar et al.[6] reported Pseudomonas aeruginosa (29.3%) as the most common agent followed by streptococcus pneumonia (25.6%). Amrutha Kumari et al.[4] reported the commonest bacterial isolates were CONS 29.41%, followed by S. aureus 21.57% and Ps.aeruginosa 19.61%.

The most common isolated fungus was Fusarium species (84.21%) followed by Aspergillus species (10.5%) and Curvularia species (5.26%).Sunilkumar Biradaret al.[6] reported Fusarium species (38.9%) as the most common followed by Aspergillus species (26.1%). Amrutha Kumariet al.[4] reported Fusuraium species (61.91%) as the most common followed by Aspergillusspp (19.05%) and curvularia species (4.76%) (Table 5).

TABLE 5: Comparision of results with similar studies

	Present Study	Amruthakumari et al.5	Gopinathan et al.6	Sunil kumar Biradar et al.7
GROWTH	19.14% Bacteria 80.85% fungi	67.17% bacteria 25.37% fungi	51.9% bacteria 38.2% fungi	29.6% bacteria 38.5% fungi
BACTERIA ISOLATED	55.5%Strep.pneumonia 22.22% Pneumococcus 22.2% Enterobacter species	29.4% CONS 21.6% Staph. Aureus 19.61%.Ps.aeruginosa	32.5%Staph.epidermidis 13.9%Strep.pneumoniae 14.5%Corynebacterium	29.3%Pseudomonas auerginosa 25.6% Strep. pneumonia
FUNGI ISOLATED	84.21% Fusarium 10.5% Aspergillus spp	61.91% Fusarium 19.05% Aspergillus spp	17.8%Fusarium 18.1% Aspergillus flavus	38.9% Fusarium 26.1% Aspergillus spp

Conclusion:

Delicate balance exists between cornea and surrounding environment that helps cornea maintain its integrity in-spite of continuous exposure to pathogens. Corneal ulceration may result when the balance is disrupted and defence mechanisms compromised. Mycotic and bacterial keratitis should be suspected in patients with a corneal lesion and should be ruled out before commencing steroids or antibiotics in order to save the sight. KOH mount microscopy method is more reliable in early detection and fungal culture is most sensitive method for diagnosis. Trauma is the most important predisposing factor. Aspergillus spp is the predominant fungus and streptococcus pneumonia is the predominant bacteria causing keratitis. Early detection and prompt treatment is important to minimize permanent visual loss. Preventive aspects like washing hands, wearing protective glasses when required should be advised to patients.

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