

MICROBIAL KERATITIS IN KANNAUJ DISTRICT: AN EPIDEMIOLOGICAL AND MICROBIOLOGICAL EVALUATIONSanjeev Rohatgi¹, Shalini Rohatgi²**HOW TO CITE THIS ARTICLE:**

Sanjeev Rohatgi, Shalini Rohatgi. "Microbial Keratitis in Kannauj District: an Epidemiological and Microbiological Evaluation". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 13, March 31; Page: 3440-3445, DOI: 10.14260/jemds/2014/2303

ABSTRACT: The aim of the present study was to identify the prevalence of non-viral etiological agents, their geographic, climatic and occupational risk factors associated with microbial keratitis in patients of Kannauj district of Uttar Pradesh, India. Microbial keratitis is a leading cause of monocular blindness world-wide. This study was conducted to find out the epidemiological factors associated with this disease in our set up. **METHOD:** A prospective analysis of 250 clinically diagnosed cases coming to OPD of Govt. Medical College, Kannauj were examined over a period of one year, from 1st January 2013 to 31st December 2013. Age, Sex, Occupation, Agents leading to the ulcer were some of the parameters included in our study. Corneal scrapes were collected and subjected to microscopy, culture and sensitivity. **RESULTS:** In 250 patients of clinically diagnosed microbial keratitis, 153(61.2%) were Males and 97(38.8%) Females. Most common Age group was 41-60 yrs. (40.8%) followed by 21-40 yrs. (39.2%). Most common cause of Microbial keratitis was Ocular Trauma. Among the microbial keratitis fungal ulcer were more frequent due to trauma by Organic Vegetative matter and as Kannauj is rural area, so Farmers were mostly affected (54%). **CONCLUSION:** Microbial keratitis is mostly seen in Farmers in this part of India. Males are affected more than Females. Aspergillus and staphylococcus aureus were the most common causative agents. Increased prevalence of Microbial keratitis was seen during harvest and post-harvest seasons.

KEYWORDS: Microbial keratitis, corneal ulcer

INTRODUCTION: Microbial keratitis is one of the leading cause of blindness worldwide, even in the era of advanced treatment options.¹The incidence is relatively high in developing countries whereas it is quite low in more developed countries. The incidence of this condition varies from places to places from 11/100,000 person/year in the United States² to 799/100,000 person/year in Nepal.³ On the other hand, the epidemiological features and causative organism for keratitis varies from country to country or even region to region within same country.^{4,5,6} Blindness surveys in Nepal⁷ too showed that corneal trauma and ulceration are second leading cause of unilateral blindness after cataract and are responsible for 11.85% of all blindness.

The causative organism includes fungi, bacteria, protozoa or viruses. It is characterized by an acute or sub-acute onset of pain, conjunctiva injection, and corneal ulceration with a stroma inflammatory infiltrate. Depending on the size and location of the ulcer, vision may be impaired. If left untreated, apart from scar formation, it can lead to endophthalmitis and even corneal perforation and blindness

As the epidemiology, there are large regional differences in the relative prevalence of each of these causative organisms determined by climatic and socio-economic factors. In tropical countries fungal corneal infection, often associated with agricultural injury, is a major cause of preventable corneal blindness. In temperate countries, such as UK, bacterial keratitis is the most common cause,

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although cases of acanthamoeba and fungal keratitis occur. Mixed infections causing keratitis can confuse the clinical picture and make management difficult.

The factors that can predispose to infectious keratitis include age, occupation, environmental factors, trauma into the eye, foreign bodies, extended wear contact lenses, chronic ocular surface disease, prior ocular surgery, diabetes mellitus, and the use of topical steroids.

The aim of this study was to evaluate the demographic and epidemiological features and the prevalence of microbial isolates in cases of microbial dermatitis in Kannauj.

MATERIAL & METHODS: This study was conducted in the Department of Ophthalmology, Govt. Medical College, Kannauj from 1st January 2013 to 31st December 2013. All the patients with infectious microbial keratitis presenting to the OPD were included, except suspected viral ulcer, mooren's ulcer, neurotrophic keratitis or any ulcer associated with autoimmune diseases were excluded from the study. Patient's data were entered into predesigned format documenting –Age, Sex, Occupation, Geographical distribution, predisposing risk factors

Every patient was examined on the Slit lamp biomicroscope, visual acuity was measured using Snellen chart. The shape, site and size of the ulcer and the depth of the infiltrate were documented. In case of history of trauma, the object and place of trauma was recorded. After a detailed ocular examination, corneal scrapings were performed under aseptic condition using a sterilized Bard parker blade No. 15, under topical anesthesia.

The scraping material was taken from leading edge and base of ulcer. Material obtained were subjected to smear preparation on glass slides for 10% KOH wet mount and gram's/giemsa stain for direct microscopic evaluation. Rest of the material was inoculated on to surface of solid media such as Blood agar, Chocolate agar for bacterial isolation, & Sabaroud's dextrose agar (SDA) for fungal culture, in a row of C-shaped streak.

LABORATORY PROCEDURES: All bacterial cultures were incubated aerobically. Cultures on blood agar, & chocolate agar were evaluated at 24 hrs. then at 48 hrs., and then discarded if there was no growth. All media's were incubated at 35° c except SDA which are incubated at 27° c in BOD incubator. Petri dishes were incubated with lids facing downwards to prevent condensed moisture from dipping on to the medium. Cultures for bacteria were considered positive only if there was moderate growth on at least two solid media. The specific identification of bacterial pathogens was based on microscopic, morphology, staining characteristics and biochemical properties using standard laboratory criteria. Fungi were identified by their colony characteristic on SDA and by their microscopic appearance in lactophenol cotton blue.

RESULTS: From 1 January to 31 December, 2013 a total of 250 patients with the clinical diagnosis of corneal ulcer were enrolled into this study. Among them, 153(61.2%) cases were males and 97(38.8%) were females, thus male to female ratio was 1.3:1.

Ulceration occurred most frequently in the age group of 41-60 years in 102 cases (40.8%), followed by 98 cases (39.4%) in the age group 21-40yrs. The extremes of life that is age group of <20 yrs. and >60 yrs., recorded comparatively low frequency (5.8% & 14% respectively). It was observed that majority of people were from Rural areas 180(72%) while only 70 (28%) were Urban areas.

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SL. NO.	Age group	Male	Female	Total
1	0-20 yrs.	08	5	13
2	21-40 yrs.	60	38	98
3	41-60 yrs.	65	37	102
4	>60 yrs.	20	17	37
	Total	153	97	250

Table 1: Frequency of microbial keratitis by age group and gender

SL. No.	Area	No. of Cases
1	Rural	180(72%)
2	Urban	70(28%)

Table 2: Area of distribution

SL. No.	Occupation	No. of cases	% of cases
1	Agricultural Worker/ Farmers	135	54%
2	Laborer	50	20%
3	Housewife/Domestic	18	7.2%
4	Tradesman/Profession	10	4%
5	Student	7	3%
6	Unemployed/Unknown	30	12%
	Total	250	100

Table 3: Occupational classification

SL. No.	Predisposing factor	No. of cases	% of cases
1	Trauma	170	68
2	Foreign bodies	15	06
3	Coexisting Ocular disorder	40	16
4	Coexisting systemic disease	20	08
5	Inadvertent use topical steroid	05	02
	Total	250	100

Table 4: Major Predisposing Factor

SL. No.	Traumatic agents	No. of cases	% of cases
1	Vegetative matter	110	64.7
2	Animal matter	10	5.9
3	Sand, Stone, Dust	18	10.5
4	Miscellaneous	32	18.8
	Total	170	100

Table 5: Nature of Trauma

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SL. No.	Growth pattern	No. of cases	% of cases
1	Fungal growth	106	42.4
2	Bacterial growth	58	23.2
3	Mixed growth	6	2.4
4	Cases with positive culture	170	68
5	Cases with negative culture	80	32
	Total	250	100

Table 6: Microbial growth pattern in 250 corneal ulcer

DISCUSSION: In developing countries like India, MK is the major cause of preventable blindness. As a result Corneal trauma is the leading cause of MK. Among the causes of trauma, fungal keratitis had vegetative matter and Bacterial keratitis had metallic foreign bodies more commonly. This shows similar results like the study conducted by Das et al in rural Bengal.⁸

Evaluation of the data in the present study, revealed that out of 250 cases of corneal ulcer, 170 cases shows positive culture for microbial growth among which 106(42.4%) cases belong to fungus, 58(23.2%) cases belong to bacteria and 6(2.4%) cases shows mixed growth. The corneal scarring is second only to cataract as the most common cause of visual disability in the world today.^{9, 10, 11}

In our study, Males 153 (61.2%) were affected more than Females 97 (38.8%). This may be due to more involvement of Males in outdoor activities mostly in rural areas. This observation is in accordance to the study of¹² who reported 64.2% Male cases.

The results of this study show that in both the genders, the maximum incidence occurred in age group of 41-60 yrs. (40.8%), followed by 21-40 age group (39.2%). In this age group, people are more physically active and at higher risk for corneal injury especially in Males who as bread earners are more involved in outdoor activities. The older age group is predisposed to ocular condition like chronic dacryocystitis, dryness, and cataract surgery etc. Also Kannauj being a largely a rural area, these people tend to wear less eye protection. These findings are similar to a study are similar to a study from Thailand,¹³ where corneal ulcer was more common in the middle age group.

Principal fungal pathogens were *Aspergillus* followed by *Fusarium*. In India, these two species are reported to be the most common agents of fungal keratitis in the study of Bharathi et al 2001.¹⁴ The reason for *Aspergillus* being the predominant fungus is because its spores survive well in hot climate of Kannauj. *Aspergillus* being the predominant fungus was also proven in the study of Basak et al 2005.⁴ The predominant bacterial pathogen was found to be *Staphylococcus aureus* followed by *Pseudomonas aeruginosa* and *Streptococcus pyogenes*. Similar reports from other parts of India as Gujarat and Madurai have also reported prevalence of *Staphylococci* (Anil Kumar et al 2011).¹⁵

All patients were started on antimicrobial treatment. 50 patients (25%) needed surgical intervention and few had to undergo evisceration. In Derek's study,¹⁶ 11.8% of the cases required surgical intervention. In our study, delay in referral and old age were risk factors and needed keratoplasty as the final treatment. Overall, the visual prognosis was related to the size of the ulcer, predisposing factors and pathogen isolated in culture.

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CONCLUSION: Kannauj district is geographically located in the central part of Uttar Pradesh. The temperature of the region varies between 22°C and 43°C. Considering the geographic, climatic and socioeconomic factors of Kannauj, the present study was conducted to determine risk factors and to assess the main pathogens involved.

The hot and dry weather of the region attributed to the predominance of *Aspergillus* (which survive better in hot climate). The main bacteria were *Staphylococcus* and *Pseudomonas*.

Alike reports from other regions of India, the present study showed Males to be more affected with main risk factor being ocular trauma. Microbial dermatitis especially due to fungal pathogens predominates during summer and harvest seasons. Kannauj being a predominantly rural area with agriculture as main occupation, such cases are very common.

Patients from villages do not reach the ophthalmologists in the initial phase of infection. Therefore, most of them get treated by village healers and reach the eye surgeon in advanced stages or in a complicated condition. This is a major concern and needs to be addressed by proper health education of the rural population and regular eye checkups during the harvest seasons.

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Date of Submission: 28/02/2014.

Date of Peer Review: 01/03/2014.

Date of Acceptance: 13/03/2014.

Date of Publishing: 28/03/2014.