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CLINICAL AND EPIDEMIOLOGICAL PROFILE OF CORNEAL ULCER IN WESTERN RAJASTHAN

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ABSTRACT

Introduction: Present study was conducted to assess the clinical profile, microbiological profile of infectious keratitis and to identify risk factors.

Methodology: A study was conducted on 98 clinically diagnosed patients of corneal ulcer with age above 6 years. Patients with viral keratitis, Mooren's ulcer/ marginal ulcer and neurotrophic ulcer were excluded. A detailed evalulation of all the patients was done including the slit lamp bimicroscopy and corneal scrapping were taken for staining and culture.

Results: The mean age of patients was 49.7 years with 60% males and 40% females. The disease was more prevalent in agriculture worker followed by household worker and labourer. Among most common pre-disposing factors include trauma from veg foreign bodies, wooden matter etc. On microbial culture 71.7% patients found to be positive out of them 37.5% were fungal positive and 30.8% bacterial positive. 71.1% patients shows KOH mount positive and aspergillus was the most common fungal pathogen . 48.6% patients were gram+ among bacterial pathogen and staph aureus was found to be the most commom gram+ pathogen

Conclusion: Fungal keratitis is more common than viral or bacterial. Trauma and pre-existing ocular diseases were the common risk factors for infective keratitis.

KEYWORDS : Infective Keratitis, Microbial keratitis, corneal ulceration

INTRODUCTION

The World Health Organization (WHO) has recognized that corneal blindness resulting from suppurative keratitis is emerging as a leading cause of visual disability. Corneal scar is a significant cause of visual impairment and blindness in the developing world. A review of the data on indications for corneal transplantation in the developing world revealed that corneal scar was the most common indication (28.1%), of which keratitis accounted for (50.5%) [1].

Suppurative keratitis is an important preventable cause of monocular blindness worldwide. Corneal infection is the second most common cause of monocular blindness after unoperated cataract in some tropical developing countries. In the developing world, corneal ulcer appears to be occurring in epidemic proportions, being ten times more common than in developed countries [1].

In developing countries, the most common predisposing factor was ocular trauma while in developed countries, it was found that contact lens wear could be a more common cause. Common organisms were bacteria and fungus [2]. Bacteria's are the most common infective organisms responsible for this morbidity [3].

Microbial keratitis (MK) is a spectrum of ocular infectious diseases, affecting the cornea and pathogenically resulting from bacterial, fungal, and protozoal etiologic organisms which can potentially cause ocular morbidity and disability. Bacterial keratitis is a serious ocular infectious disease that can lead to severe visual disability. Many patients have a poor clinical outcome if aggressive and appropriate therapy is not promptly initiated [4]. The spectrum of bacterial keratitis can also be influenced by geographic and climatic factors[5].

Approximately 2 million people develop a corneal ulcer every year in India alone [6].With an increasing incidence in recent years, Bacterial keratitis rarely occurs in the normal eye because of the human cornea's natural resistance to infection. However, predisposing factors, including contact lens wear, trauma, corneal surgery, ocular surface disease, systemic diseases, and immunosuppression, may alter the defence mechanisms of the ocular surface and permit bacteria to invade the cornea [7].

The aim of the study was to identify predisposing factors, epidemiologic characteristics, clinical and microbiological characteristics of microbial keratitis our current practice.

MATERIAL AND METHODS

A prospective study was conducted for a period of one year in the department of Ophthalmology, Dr. S.N Medical college, Mathura Das Mathur Hospital Jodhpur

Inclusion Criteria: Clinically diagnosed patients of corneal ulcers and Patient above age of 6 years.

Exclusion Criteria: Patients of viral keratitis; Mooren's ulcer/ marginal ulcer and Neurotrophic ulcer

A detailed ocular examination of both diseased and healthy eye was performed in diffuse light and under Slit lamp biomicroscope, Size of ulcer was measured by staining with 2% fluorescein stain paper strip and recorded in mm and graded accordingly.[11]

A sketch of each ulcer was drawn using standardized frontal and cross sectional diagrams and clinical diagnosis were made. Associated ocular conditions such as blepharitis, dacrocystitis, dry eyes, lagopthalmos were noted and addressed accordingly. After ocular examination Corneal scraping was performed under strict aseptic condition using a sterile Bard-Parker blade no 15 under topical anesthesia (proparacaine eye drop) and sent for culture and sensitivity to confirm clinical diagnosis. Follow up of the patient for symptomatic relief, size of ulcer was done at day 7, 14 , 1month and 3 months.

OBSERVATIONS

The mean age of patents was found to be 49.7±18.9 years with number of patients was more prevalent in 3rd , 4th and 5th decade of life. The disease is more common in male (60%) as compared to female (40%) with male to female ratio is 1.5:1. Here, 95% patients were from rural area and only 5% patients were from urban area.

Left eye and right were equally prone to disease with 50% patients having disease in left eye, 48.3% had disease in right eye and 1.7% had disease in both the eye. We found that corneal infection was more common among agriculture worker are more prone to disease with 59.2% patients followed by house hold (14.2%), laborer (13.3%), student and driver (4.2%) (Fig: 1).

Most common pre disposing factor is veg foreign body (29.2%) followed by wooden matter (15.83%), miscellaneous trauma (13.3%), stone/sand (8.3%), co-existing ocular disease (7.5%), Co-existing systemic disease (7.5%) and other factors like animal matter, use of steroid, no. specific history, contact lens wearer and Past Ocular history contribute less than 5% to disease (Table:1).

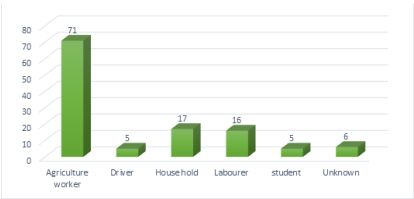

Fig 1: Distribution according to occupation.

Table 1: Pre-disposing Factors

Pre disposing factor	N	%	
Trauma	Veg foreign body	33	27.5
	animal matter	6	5
	sand/stone	10	8.3
	wooden matter	18	15
	Miscellaneous trauma	16	13.3
co-existing ocular disease		8	6.7
Co-existing systemic disease		9	7.5
use of steroid		1	0.83
no. specific history		12	10
contact lens wearer		2	1.6
Past Ocular history		5	4.2

Here, 45% patients had no previous treatment history, 40.8% patients had taken previous treatment from quack and 14.2% had taken their previous treatment from other private or government hospitals.

On microbial culture we found 71.7% cases show culture positive and 28.3% show negative on culture test. In 37.5% patients there were fungal growth followed by 30.8% had bacterial growth and 3.3% had both type of pathogen was found. In 28.3% no growth was found. Out of 45 patients which shows fungal growth, 71% shows KOH positive and 28.9% shows KOH negative on KOH mount. Out of 37 which shows bacterial growth, 48.6% were gram stain positive bacteria and 16.2% were gram stain negative and 35.2% took no stain (Table:2).

Table:2

Pathogen	No. (%)		
Fungal	45 (37.5%)	KOH+	32 (71.1%)
		KOH-	13 (28.9%)
Bacteria	37 (30.8%)	Gram+ stain	18 (48.6%)
		Gram- stain	6 (16.2%)
		No stain	13 (35.2%)
Mixed	4 (3.3%)		
No growth	34 (28.3%)		

On culture we found that out of total gram positive 64.3% were Staph aureus, 21.4% CONS and 14.3% were Strep pnuemoniae bacteria. Out of total gram negative 77.8% were Pseudomonas and 22.2% were Klebsiella. Out of total fungal pathogen 57.8% were Aspergilus, 40% Fusarium and 2.2% were Candida albicans (Fig:2).

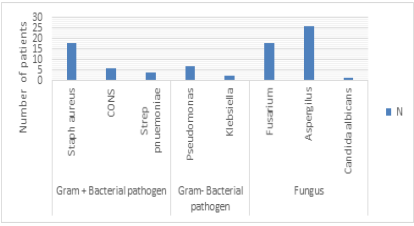

Fig:2

According to grade wise distribution 54.2% had severe corneal ulcer, 30% had moderate and 15.8% had mild corneal ulcer (Fig:3).

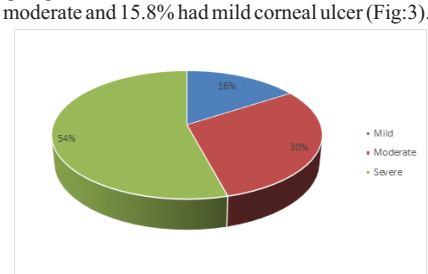

Fig:3

DISCUSSION

Despite therapeutic advances in the treatment of corneal ulcer, it continues to be a major cause of blindness, especially in developing nations. Its incidence rate changes significantly across regions and countries. As a result, corneal scarring is the second only to cataract as the most cause of visual disability in the world today[8]

In our study there was male preponderance with male to female ratio was 1.5:1. Gopinathan et al [9] found that male preponderance in this series was observed not only in the overall clinically suspected cases of microbial keratitis but also in culture-proven cases of microbial keratitis (male: female:2.25:1, 2.24:1 respectively).Though both sexes develop corneal ulcers more commonly in the middle decades of life, a significant male preponderance has been reported by most previous studies[10-11] including those in children and elderly patients. Chidambaram et al[12] found that individuals were often male and within the working age-group and this show male preponderance in their study which is in agreement with our results.

In our study the main predisposing factor was trauma which includes veg foreign body (29.2%) followed by wooden matter (15.83%), miscellaneous trauma (13.3%), stone/sand (8.3%), co-existing ocular disease (7.5%) and other factor were co-existing ocular disease (7.5%), Co-existing systemic disease (7.5%) and other factors like animal matter, use of steroid, no. specific history, contact lens wearer and Past Ocular history contribute less than 5% to disease. Otri et al [13] found that Ocular surface disease was the most common predisposing factor (32.8%). In this respect, a background of HSK was the main risk factor . Contact lens (CL) wear and previous ocular surgeries were also common being 26.5% and 20.2%, respectively. Chronic topical steroids use was a shared risk factor in 40% of cases. Gopinath et al [9] found that Considering the predominant predisposing factor of trauma in all types of microbial keratitis (bacterial ñ 46.6%, fungal ñ 81.9%, Acanthamoeba ñ 95.5%) the probable reason for male preponderance is obvious.

In our study disease was more prevalent in agriculture worker (59.2%) followed by house hold (14.2%), laborer (13.3%), student and driver (4.2%). Gopinath et al [9] classified the occupation as outdoor (agriculture and manual labor), and indoor (desk job and household). They found that more number of patients with fungal, Acanthamoeba (pure cultures) and polymicrobial keratitis (bacteria and fungus; bacteria and parasite) were found to be involved in agriculture-related activities ($P < 0.001$) as compared to other. Chidambaram et al [12] study shows that agricultural workers are predominantly affected and that exposure to corneal. They found that vegetative matter was the most common pre-disposing factor, this highlights the fact that corneal injury with vegetative matter may provide a route of entry for other pathogens such as S. pneumoniae that are not classically known as plant pathogens.

In our study 40.8% patients had taken previous treatment from quack and 14.2% had taken their previous treatment from other private or government hospitals. Gopinath et al [9] found that More than half of the patients with culture-proven microbial keratitis (54.6%) had visited a physician prior to presentation at this institute and nearly half (48.6%) of them had received antimicrobial agents that were appropriate, albeit on lower dosage, for the microbial agent involved. Therefore, we believe that despite the patient being on prior antimicrobial therapy, microbiological investigation may succeed in establishing etiological diagnosis in at least 50% of the patients. Traditional medicine or home remedy was used by only 0.4% of our patients compared to 37.3% of the patients in the study from Madurai. The urban location of our institute in contrast to the semi-urban location of the institute at Madurai may account for this difference. In our study also, 95% patients were from rural area and only 5 patients were from urban area. Patel et al [1] study also reported that majority of patients were from rural areas in their study 73.3% were from rural areas and 26.7% were from urban areas.

Here, 71.7% cases show culture positive and 28.3% show negative on culture test. In a study by Otri et al [13] found that 53 (41.7%) eyes showed positive growth and 74 (58.26%) eyes revealed no growth. Sixteen eyes were not scraped. In 37.5% patients there were fungal growth followed by 30.8% had bacterial growth and 3.3% had both type of pathogen was found. In 28.3% no growth was found.

In our study, the most common pathogen for ulcer was found to be fungus (37.5%) followed by 30.8% had bacterial growth and 3.3% had

both type of pathogen. Gopinath et al[9] also found that the detection of fungi and Acanthamoeba was much higher in the smears than it was for bacteria. The detection rate for bacteria (Gram stain) was reduced by 10.9% when a correlation of the presence of similar bacteria in smears and cultures was made. In our study out of 45 patients which shows fungal growth, 71% shows KOH positivity and 28.9% shows KOH negative on KOH mount.

Here, in 48.6% patients gram positive bacteria cause ulcer as compared to 16.2% patients where gram negative bacteria was the causative agent. In gram positive bacteria we found 64.3% Staph aureus, 21.4% CONS and 14.3% were Strep pnuemoniae bacteria. And in gram negative 77.8% were Pseudomonas and 22.2% were Klebsiella. In concordance with this study by Gopinath et al[9] found that Bacterial keratitis were predominantly caused by gram-positive bacteria. However, unlike other studies from Asia (Ormerod,1987; Katz,1983)[11,14] and Africa (Carmichael, 1985)[15] where infections by Streptococcus pneumoniae were most common; in their study, Staphylococcus epidermidis-related bacterial keratitis predominated.. Otri et al[13] found that Twenty-six eyes (49%) yielded Gram- positive bacteria, 18 (33.9%) had Gram-negative bacterial infections. Out of culture-positive group, the commonly isolated organisms were Staphylococcus aureus, Pseudomonas aeruginosa and Acanthamoeba with positive culture results in 10, 8 and 9 of the overall 53 culture-positive cases, respectively. Out of fungal ulcer 71.1% were KOH positive and the most common fungus was Aspergilus (57.8%) followed by 40% Fusarium and 2.2% were Candida albicans in our study. Study by Gopinath et al[9] found high prevalence of fungal keratitis caused by filamentous fungi in warmer climates.

CONCLUSION

In this study, the infectious corneal ulceration was predominant in adult males of rural background, with vegetative matter induced ocular trauma as the major predisposing factor. A simple KOH preparation was highly beneficial as a rapid screening test for diagnosis. Fungal corneal ulcers were more common than bacterial ulcers. Aspergillus spp. and Staphylococcus aureus were the most common fungus and bacteria causing corneal ulcers respectively. From the present study, the vital role of microbiological evaluation in the management of infectious corneal ulcer is clearly evident, since the clinical features alone are not adequate to confirm infection. It is important to create awareness among people especially from rural background with regard to trauma as a major predisposing factor for corneal ulcers. Precise identification of the causative organisms and timely institution of appropriate antimicrobial therapy based on the prevailing sensitivity pattern of the fungal and bacterial isolates could save the eye from this preventable cause of blindness.

Incidence can be reduced, if the predisposing factors can be controlled. Moreover, knowledge of how to prevent ocular trauma, vegetative trauma and proper care for contact lens, which are the main predisposing factors, may reduce the chances of emerging cases of corneal infection. If treatment starts at early stage then basic laboratory investigations & knowledge of clinical features is very helpful in effective management of corneal ulcers.

A community based awareness program regarding risk factors like trauma to eye and use of medications without proper prescription may create a difference in over all scenario of ulcer presentation.

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