THE PREDISPOSING FACTORS FOR MOCROBIAL KERATITIS IN PATIENTS WITH RED EYE REPORTING TO THE MILITARY HOSPITAL RAWALPINDI

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ABSTRACT

Objective: to find out the predisposing factors for the cases of mocrobial keratitis in patients with red eye reporing to the Military Hospital.
Study Design: Cross-sectional study.
Place and Duration of Study: Ophthalmology deparment, Military Hospital Rawalpindi during 06 months from 1st Jun 2001 to 31st Dec 2001.
Methodology: This was cross-sectional study which included consecutive cases of red eye. Cases referred from other military hospitals and field medical units were also included in the study. Inclusion Criteria was serving officers and their family members including parents, wife and children, retired JCOs/NCOs/Other ranks. Exclusion criteria was all cases of cataract surgery who had transient period of red eye were excluded from the study.
Results: Out of 857 patients who reported with red eye during 06 months 32 cases fulfilled the criteria for microbial keratitis. The frequency of microbial keratitis in our population sample was found to be 3.7%. Out of 32 patients of microbial keratitis predisposing factors were found in most of the cases. These included history of accidental trauma in 14 patients (43.75%), bullous keratopathy in 3 patients (9.37%), corneal exposure in 3 (9.37%), contact lens wear in 2 (6.25%), dry eyes in 2 (6.75%), and corneal graft in one patient (3.13%). Two patients had history of excessive and prolonged use of topical steroids (6.25%).
Conclusion: The frequency of microbial keratitis in our population sample was quite common. Patients coming with ophthalmic problems, i.e., red eye, photophobia, irritation and watering to the general practitioner should be referred as soon as possible to the ophthalmology department.

Keywords: Bullous Keratopathy, Mocrobial Keratitis, Predisposing Factors, Red Eye.

INTRODUCTION

Microbial keratitis is defined as inflammation of the cornea due to replicating organisms[1,2]. The distinction between microbial and aseptic keratitis is important as every disease has to be treated differently. The diagnosis of exclusion is aseptic keratitis[3].

The clinical criteria for presumed microbial keratitis are as follows as lesions often central but can be in any location. Lesions >1mm in diameter, Epithelial defect, Progressively deteriorating pain, sometimes severe, Diffuse and/or severe progressive corneal suppuration, Iridocyclitis[4].

BACTERIAL KERATITIS

Gram Positive Organisms, the more common bacteria isolated from bacterial corneal ulcers are, Staphylococci and Streptococci. Less common gram-positive organisms include aerobic, spore forming bacilli Bacillus coagulans and B. brevis, as well as Corynebacterium diphtheriae. **Gram Negative Rods**, common symptoms of corneal ulcers are decsreased visual activity, photophobia, pain, redness and discharge[5].

Fungal Keratitis is due to corneal invasion by filamentous fungi, yeasts, and dimorphic fungi. The steps in the management of fungal keratitis are similar to other forms of infectious microbial keratitis. Fungi of medical importance are classified into three types:

a) Filamentous fungi (molds).
b) b)Yeasts.
c) Dimorphic fungi.

Filmentous dungi are further divided into

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a) Septate (hyphate) organisms.

b) Nonseptate Organisms.

More than 60 genera of fungi have been implicated in human keratitis. The main causes throughout the world are the septate filamentous fungi, most commonly Alternaria, Aspergillus, Curvularia, and Fusarium: and yeasts, most commonly Candida[6,7].

ACANTHAMOEBA KERATITIS

Acanthamoeba is a ubiquitous, free-living organism that causes a severe ketatitis. High risk groups are contact lens wearers who use non-sterile solutions in their lens care regimen. Useful vision is frequently lost due to this infection[8].

The study was done with the objective to find out the predisposing factors for the cases of mocrobial keratitis in patients with red eye reporing to Ophthalmology deparment.

METHODOLOGY

This was cross-sectional study which included consecutive cases of red eye. Cases referred from other military hospitals and field medical units were also included in the study. Inclusion Criteria was serving officers and their family members including parents, wife and children, retired JCOs/NCOs/Other ranks. Exclusion criteria was all cases of cataract surgery who had transient period of red eye were excluded from the study. Sample size was calculated from WHO sample size caculator. Permission of study was taken from Hospital Etical Review Board and informed consent was taken from all the recruited patients.

Solid culture media were used for the inoculation of the specimen. It was done immediately after taking the specimens. The following media wer used:

a) Dextrose-peptine agar (with yeast extracts, without cyclohexamide but with 50 ug/ml chloramphenicol)

b) Blood agar

c) Chocolate agar

d) MacConkey agar

e) Liquid media (brain heart infusion)

Smearing of the scrapings was done onto clean glass slides for Gram-staining and microscopy. The inoculation media were incubated at their respective optimal temperatures.

Blood agar dishes were incubated at 37°C in aerobic as well as anaerobic atmosphere. Sabouraud's agar was placed at 28°C in aerobic conditions. Chocolate agar dishes were incubated in CO_2-incubator with 5-10% CO_2. All other media were incubated at 37°C in aerobic conditions. Fungi were identified by their hyphae or yeast pattern. Acanthamoeba was identified by its amoeboid movements.

Exact pathogen responsible for keratitis was identified by performing the following tests of the colonies:

a) Gram staining

b) Motility test

c) Oxidase test

d) Catalase test

e) Biochemical profile with APS (Analytical profile index)

Corneal biopsy was taken in cases where no growth was seen.

The patients were admitted in eye ward and were subjected to the following treatment:

a) Intensive topical and systemic broad spectrum antimicrobial therapy

b) Sub-conjunctival injection of antibiotics (in severe cases)

c) Topical cycloplegics

d) Oral analgesics

All the data was entered and analyzed in SPSS-20.

RESULTS

The study included cases of microbial keratitis selected according to inclusion criteria. Out of 857 patients who reported with red eye during 06 months 32 cases fulfilled the criteria for microbial keratitis. The frequency of microbial

keratitis in our population sample was found to be 3.7%. Out of 32 patients of microbial keratitis predisposing factors were found in most of the cases. These included history of accidental trauma in 14 patients (43.75%), bullous keratopathy in 3 patients (9.37%), corneal exposure in 3 (9.37%), contact lens wear in 2 (6.25%), dry eyes

Table-I: Predisposing factors for cases of microbial keratitis (n=32).

Factor	No. of Patients	%
1) Trauma		
Accidental		
a) Foreign Body	8	25.00
b) Tree Twigs	6	18.75
Surgical	-	-
2) With in Graft	1	3.13
3) Contact Lense Wear	2	6.25
4) Bullous Keratopathy	3	9.37
5) Corneal Exposure	3	9.37
6) Dry Eye	2	6.25
7) Excessive use of Topical Steroids	2	6.25

in 2 (6.75%), and corneal graft in one patient (3.13%) (table-I) Two patients had history of excessive and prolonged use of topical steroids (6.25%). The frequency of microbial keratitis in various groups was studied individually and it was found out that it is highest I retired army personnel and their wives (5.5%), almost equal in parents of serving personals a that of children (3.5 & 3.3% respectively) and lowest in serving personals and their wives (2%). Out of all cases 623 were male and 234 were females. The frequency of microbial keratitis was found almost double in males. (4.3%) as compared to fenales (2.1%). Majority of cases of red eye reported from urban areas (63.5%) but the frequency of microbial keratitis was much higher in rural population (6.09%) as compared to that of urban population (2.4%). 18 of 310 cases of red eye were between 40-60 years of age, suffered from microbial keratitis showing the highest frequency of all i.e., 5.8%. Six of 179 cases of red eye belong to age group bellow 20 years with frequency of 3.4%. Seven out of 229 cases were from 60 and above age group with frequency of 3.1%. The lowest frequency of microbial keratitis was found to be in age group of 20-40 years with only one case out of 139 cases of red eye showing 0.7% frequency (table-II). Most of them were parents of soldiers and belonged to villages of Punjab, NWFP, and Azad Kashmir. Thirteen patients belonged to urban population which comprised soldiers, NCOs, JCOs, and their families living with them in the cities. Patients living in the urban areas reported early to the hospital/eye department. Most of them reported within a week's time. The rural population reported late, most of them in the second week. A few even reported later, i.e., in the third week.

Five (15.62%) out of 32 cases did not present with uncomfortable eyes, because of microbial keratitis in corneal dystrophy and exposure keratitis (table-III). Rest of the cases presented with photophobia, redness, and watering. Marked deterioration of the visual acuity was present in 29 cases. In 2 (6.25%) the visual acuity was

Table-II: Frequency of microial keratitis in various age groups, gender and different geographical areas (n=857).

Variables	No. of Patients of Red Eye	No of Patients of M.Keratitis
Age Group		
0-20 years	179	06
20-40 years	139	1
40-60 years	310	18
60 & Above	229	07
Gender		
Male	623	27
Female	234	5
Population		
Rural	312	19
Urban	545	13

already less than 6/60 because of advanced corneal dystrophy (table-IV & V).

All patients were put on broad spectrum antibiotics, topically, and systemically after taking the laboratory samples. Eight (25%) of them with history of injury to the eye with plants in the field or with tree twigs and excessive use of steroids, were put on broad spectrum antifungal drops i.e.,

nizoral, tablet ketoconazole 200 mg dissolved in 15 ml of artificial tears, along with the antibiotics. Antiviral eye ointment was also started in 3 (9.37%) of these cases with decreased corneal sensitivity along with broad spectrum antibiotics.

Treatment was restricted to one antibiotic in 6 (18.75%) of the cases, to antifungal drops and ointment in 4 (12.5%) of the cases, and continued with the same antibiotics covering gram negative and gram positive bacteria in 22 (68.75%) of the cases. Conjunctival flap was applied in 4 (12.5%) cases with risk of perforation. Penetrating keratoplasty was done in 7 (21.87%) of the patients, courtesy of Srilankan association of cornea donation. Five (71.43%) of these cases took up the graft well, but 2 (28.57%) grafts failed. Regrafting was planned for them. Retrobulbar injection of alcohol was given to 3 (9.37%) of the patients with persistently intolerable painful eye, with no chance of useful vision. Evisceration/ enucleation has been planned for 1 patient (3.13%) in which all treatment modalities have failed.

Table- III: Barious type of Microbial Keratitis (n=32).

Causative Organisms	No. of Patients	Percentage
Bacterial	24	75
Fungal	4	12.5
Parasitic	-	-
Undiagnosed	4	12.5
Table-IV: Bacterial Keratitis (n=24).		
Type of Bacteria	**No. of Patients**	**Percentage**
Staph Aureus	11	45.83
Strep Pneumoniae	8	33.33
Pseudomonas Aeruginosa	4	16.67
Haemophilus SPP	1	4.167
Table-V: Fungal Keratitis (n=04).		
Type of Fungi	**No. of Patients**	**Percentage**
Fusarium SPP	02	50
Candida Albicans	01	25
Aspergillus Apecies	01	25

DISCUSSION

During the specified time frame 857 consecutive cases of red eye were studied in detail and 32 cases met the criteria of microbial keratitis. The over all incidence of microbial keratitis was calculated to be 3.7 percent. The most affected group of persons involved was fathers of serving soldiers, JCOs and other ranks, most of them falling between the ages of 51-60 years (pentagenarian) this shows increased incidence of microbial keratitis in the elderly. Twenty five out of 32 patients were over 40 years of age. Amongst the group of patients less than 40 years of age, the most affected were less than 10 years. 27 out of 32 cases had a predisposing cause in which the commonest was trauma to the eyes. 84% of the subjects were male and 15% female, 19 (59.375%) belonged to rural population while 13 (40.625%) belonged to urban areas. Nineteen (56.25%) of subjects belonged to lower middle class.

The group most affected or at higher risk in our setup came out to be pentagenarian males, belonging to lower middle class of rural population having trauma to the eye while working outdoors, in the fields, or otherwise. Another large group consists of preexisting corneal diseases like degenerations, dystrophies, bullous keratopathy, corneal exposure and dry eyes; Use of contact lenses by females in our polluted atmosphere is yet another cause of microbial keratitis. Another important cause leading to microbial keratitis is inadvertent use of topical medication like steroids, antibiotics and anaesthetics[9-12].

Incorrect and inappropriate treatment by general practitioners, late reporting or referral to eye specialist, inability to diagnose properly, lack of laboratory facilities, and poor compliance of patient/attendants leads to complications of the disease and visual loss[13-16]. Each case of microbial keratitis should be taken as an ophthalmic emergency and must be admitted so that proper diagnosis, thorough investigations and correct treatment should be given because the end result of any microbial keratitis can be panophthalmitis, and orbital cellulitis, as well as cavernous sinus thrombosis which can ultimately lead to death[17,18].

Good nursing care, timely instillation of topical medication, daily review and change of

medicine as per laboratory results is the key to successful management.

Some patients require surgical intervention, such as

- Keratoplasty in cases of permanent opacification.
- Conjunctival flap/tarsorrhaphy in cases of impending perforation and even retrobulbar alcohol injections.
- Evisceration/enucleation in cases of painful blind eye.

CONCLUSION

The frequency of microbial keratitis in our population sample was quite common. They should be educated about proper washing of eyes, wearing of protective glasses while working in the factories, and conditions leading to ophthalmic trauma. Patients coming with ophthalmic problems, i.e., red eye, photophobia, irritation and watering to the general practitioner should be referred as soon as possible to the ophthalmology department.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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