

## Microbial Flora of Corneal Ulcer and their Drugs Sensitivity.

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### ABSTRACT

**Introduction:** Corneal ulcer is a leading cause of ocular morbidity and blindness worldwide. Knowledge of the common organism causing corneal ulcers and the sensitivity of the bacteria will help formulate the first line of treatment which would have relatively high percentage of success even in areas devoid of diagnostic facilities. The main objective of this study was to find out commonest organisms that cause corneal ulcers and to determine their antimicrobial susceptibility.

**Methods:** This was a prospective study of 55 consecutive cases of corneal ulcers. Patients who had congenital abnormality of cornea, uncooperative patient not allowing to do corneal scrapping, patient with suspected or confirmed viral keratitis, Patient with corneal ulcer with HIV positive and all non-infective corneal ulcers were excluded from the study.

**Results:** Of 55 cases enrolled in this study microorganisms were grown from 31 (56%) cases. Of 31 growth positive cases, 17 (54.8%) showed pure bacterial growth, 13 (41.9%) cases showed pure fungal growth and in only 1 (3.2%) case there was mixed (bacteria and fungus) growth. Among the tested antibiotic, sensitivity of Ciprofloxacin and Gentamicin was 100% and that of Ceftriaxone was nearly 94%. Almost 20% bacteria were resistant to Chloramphenicol. Sensitivity of newer quinolone (Ofloxacin) was also not very high, having more than 20% bacteria resistant to it.

**Conclusions:** The commonest organism responsible for bacterial keratitis was strepto. Pneumonia. Ciprofloxacin and Gentamicin were the most sensitive antibiotics.

**Keywords:** corneal ulcer, blindness, sensitivity, antibiotics.

### INTRODUCTION

Corneal ulcer is a leading cause of ocular morbidity and blindness worldwide<sup>1</sup>. In some developing countries of the tropics and subtropics, corneal infections are the second commonest cause of blindness after unoperated cataract<sup>2</sup>. Nepal, being a developing country, most of her population depend on agriculture, so they are more exposed to agricultural trauma during their work. Moreover, lack of knowledge and poor health facility are the reasons for trivial ocular trauma leading to corneal ulcers. Knowledge of the common organism causing corneal ulcers and the sensitivity of the bacteria will help formulate the first line of treatment which would have relatively high percentage of success even in areas devoid of diagnostic facilities. In Nepal with

limited static health institutions and fewer medical staffs this would facilitate institution of early and appropriate therapy. The main objective of this study is to find out commonest organism that causes corneal ulcers and to determine their antimicrobial susceptibility.

### METHODS

This prospective study was conducted at Nepal Eye Hospital from over a period of one year. A total of 55 patients who were admitted in Nepal Eye Hospital were enrolled in this study. All the patients with corneal ulcer with or without hypopyon of all age group were included. Patients who had congenital abnormality of cornea, uncooperative patient not allowing to do corneal scrapping, patient with suspected or confirmed

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viral keratitis, patient with corneal ulcer with HIV positive and all non-infective corneal ulcers were excluded from the study. Data were analyzed using the SPSS v13 program.

All patients underwent corneal scraping. In patient, who have already used antibiotics, antibiotics were stopped for 12-24 hours and scraping was done. After instillation of topical anesthetics, a speculum was placed for better exposure of cornea and to decrease the mobility of lids. Then with the help of Kimura spatula or No. 15 surgical blade, the ulcer was scraped from the margin and base. The scraped materials were subjected to Gram stain, KOH, and inoculated in the four different culture media ( Blood agar, Chocolate agar, Mc Conkey agar and Sabouraud dextrose agar). All the media were incubated at room temperature except Sabouraud dextrose agar, which was incubated at 27 degree centigrade. After the scraping of the ulcer patients were treated with broad-spectrum antibiotic or antifungal depending on history and ulcer pattern. The treatment was changed later according to the sensitivity report.

**Table 1. Demographic parameters**

Age	
Mean	55±20.04
Range	10-90 Years
Age group (Years)	
Less than 20	6 (10.9%)
21-40 years	15 (27.3%)
41-60 years	18 (32.7%)
More than 60	16 (29.1%)
Sex	
Male	30 (55%)
Female	25 (45%)
Occupation	
Farmer	30 (55%)
Housewives	11 (20%)
Students	6 (10.9%)
Laborers	1 (1.2%)
Others	7 (12.7%)
Literacy	
Illiterate	29 (53%)
School literate	17 (31%)
Literate	9 (16%)

## RESULTS

During the study period a total of 95 patients were admitted in septic ward of Nepal Eye Hospital with the diagnosis of corneal ulcers. 40 patients were excluded from the study because of various reasons like viral

keratitis, uncooperative patients and non-infective keratitis. Remaining 55 patients, who fulfilled the inclusion criteria, were enrolled in the study and their demographic data are shown in Table 1.

The commonest organism responsible for bacterial keratitis was Strepto. Pneumoniae (29.41%) and was followed by Staphylococcus Aureus (11.76) (Table 2). From 31 culture positive cases, 13 (41.9%) were fungus. The most common fungus was Candida Albicans (38.46%), and was followed by Aspergillus Species (30.76%) (Table3). Among the tested antibiotic, sensitivity of Ciprofloxacin and Gentamycine was 100% and that of Ceftriaxone was nearly 94%. Almost 20% bacteria were resistant to Chloramphenicol. Sensitivity of newer quinolone (Ofloxacin) was also not very high, having more than 20% bacteria resistant to it (Table 4).

**Table 2. Pattern of Bacterial growth**

Bacteria	Frequency	Percent
Strepto. Pneumoniae	5	29.41%
Staphylococcus Aureus	2	11.76%
Pseudomonas Aeruginosa	2	11.76%
Klebsiella species	2	11.76%
Streptococcus Viridence	1	5.88%
Strepto. Pyogenes gr A	1	5.88%
Strepto. Pyogenes	1	5.88%
Hemophilus species	1	5.88%
Aeromonas species	1	5.88%
Acinetobacter species	1	5.88%
Total	17	100%

**Table 3. Pattern of Fungal growth**

Fungus	Frequency	Percent
Candida Albicans	5	38.46%
Aspergillus Species	4	30.76%
Carbularis Species	1	7.69%
Epidermophyton Species	1	7.69%
Microsporium Species	1	7.69%
Rhizopus Species	1	7.69%

## DISCUSSION

Table 4. Drug sensitivity pattern

Antibiotics	tested	Sensitive		Partial sensitive		Resistant	
		No	%	No	%	No	%
Ciprofloxacin	14	14	100%	0	0%	0	0%
Gentamycine	8	8	100%	0	0%	0	0%
Chloramphenicol	16	12	75%	1	6.25%	3	18.75%
Ceftriaxone	16	15	93.75%	0	0%	1	6.25%
Ofloxacin	9	7	77.7%	0	0%	2	22.3%
Cotrimoxazole	14	7	50%	0	0%	7	50%
Penicillin	12	9	75%	1	8.33%	2	16.66%
Ampicillin	11	7	63.63%	1	9.09%	3	27.27%

In view of frequent reports of changing pattern of susceptibility among the bacteria, testing of isolates for their sensitivity to various antimicrobial drugs is necessary for selection of appropriate antibiotics.

Majority of the patient (54.5%) in our study were farmer, followed by housewives (20%), students (10.9%), and laborers (1.2%) (Table1). Similar distributions were mentioned by M .P. Upadhyay<sup>3</sup>, Bashir. G<sup>4</sup>, Deshpande S.D<sup>5</sup>. During literature review we noticed that, majority of the patients were contact lenses users in developed countries<sup>6,7</sup>. Farmers were not mentioned in their literatures. Farming is the most common occupation in our country and only professionals do farming with adequate protection and equipments in developed countries. Lack of protection and awareness of injury during farming may be the cause of high incidence of corneal ulcers in farmers in our part of the world.

Trauma was the most frequent predisposing factor affecting 35 out of 55 cases, a percent prevalence of 64%. All cases of injury were accidental. We did not encounter cases of corneal ulcers following surgical injury though they have been reported by other studies<sup>8,9</sup>. Trauma was prevalent predisposing factor in many studies, MP Upadhyay<sup>3</sup> (52.8%), Basak SK<sup>10</sup> (82.9%), Shrinivasan M<sup>11</sup> (65.4%). Vegetative matters were the most frequently identified traumatic agents 28 (80%) out of 35 traumatic cases (Figure 1). This is easily explained by deployment of large section of Nepalese population in agriculture. The corneal ulcers in Nepal are an agriculture dependant occupational hazard is further supplied by the fact that paddy, which is the principal crop, accounted for almost one third (31.4%) of all injury cases. In other injury cases, maize accounted

for 17.1%, leaf 17.1% and wood stick for 11.4% of all trauma cases. During the study period we had no cases of contact lenses related corneal ulcers which was considered to be one of the commonest causative factor in developed countries<sup>12-16</sup>. The reason behind this is the rare use of contact lenses in our country. Very few people in Nepal use contact lenses, where as it is used frequently in developed countries. The other reason may be the small sample size of the study.

According to various studies the incidence of culture positive cases vary from 45% to 90%<sup>3,10-12, 16,17,18</sup>. In a study from Nepal<sup>3</sup> which was published in 1988 organisms were grown from 80% of the cases. In another study from Nepal<sup>12</sup>, the growth percentage was only 45.3%. In our study the growth percentage was 56%. Wide variation in culture positivity may be because of antibiotics use prior to presenting in hospital.

Among 31 culture positive cases 17(54.8%) were bacteria, 13 (41.9%) were fungus and we had only 1 cases (3.2%) of mixed growth. Similar growth incidence was reported by Dunlop AA<sup>19</sup>, Srinivasan<sup>11</sup> and Williams G<sup>20</sup>. During literature review we noticed wide range of bacterial and fungal growth<sup>3,10,21,16</sup>. This variation may be because of the various geographical and environmental conditions in which the studies were conducted.

Bacterial spectrum of our study was similar to most of the previously reported series<sup>3,11,22,21</sup>. Dunlop AA et al<sup>19</sup> reported pseudomonas as the most frequent bacterial pathogen. Whereas others have reported<sup>6,9,10,23</sup>

Staph. Aureus as the commonest isolate. In our study the commonest isolate was Streptococcus Pneumoniae, which accounted for 29.41% of all bacterial isolates. Pseudomonas aeruginosa and klebsiella species were found to be the predominant gram negative isolates accounting for 28.55% among the isolates.

Various studies<sup>3,12,23,24</sup> have mentioned the higher sensitivity to ciprofloxacin and remained same in our study also. Very few studies<sup>7</sup> have mentioned about the Gentamycine, but we found 100% sensitivity to Gentamycine. We think that ciprofloxacin and Gentamycine must be considered as the choice of drug for bacterial corneal ulcer.

## CONCLUSION

The commonest organism responsible for bacterial keratitis was Strepto. Pneumoniae (29.41%). Among fungal growth Candida Albicans was the commonest fungus. Among the tested antibiotics sensitivity of Ciprofloxacin and Gentamycine was 100% and that of Ceftriaxone was nearly 94%.

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