**Original article:**

# Microbial profile of suppurative keratitis at an eye care centre in western india

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**Abstract**

**Purpose:** This study was conducted to determine the clinical and microbial profile of suppurative keratitis at an eye care centre in rural India.

**Materials and methods:** In our study 70 patients with suppurative keratitis were enrolled. Detailed history and detailed ocular examination of each patient was done.Corneal scraping was sent to microbiology laboratory for following investigations-

1. Gram staining
2. 10% KOH preparation
3. Bacterial culture using blood agar
4. Fungal culture using Sabourad's dextrose agar medium.

**Results:** Age range of 41-60 years was the most affected group (47.14%).Male patients(54.28 %) were more affected. Most of the patients were farmers (58.57%). History of vegetative trauma was the most common predisposing factor present in 52.84% cases.In present study 18(25.71%) cases were fungal,10(14.28%) were bacterial and 4 (5.71%) cases showed mixed bacterial and fungal infection.

**Conclusion:** Fungal ulcers were more common than bacterial ulcers. The age range of 41-60 years was most affected group. Vegetative matter trauma was the most common predisposing factor for suppurative keratitis in rural population. This brings out the importance that thorough microbiological examination in all cases with suppurative keratitis is necessary in order to detect the etiology and prevent the complications.

## INTRODUCTION

Corneal blindness ranks next to the cataract among the major causes of blindness.Corneal blindness is responsible for 1.5 to 2 million new cases of monocular blindness .Every year ocular trauma and corneal ulceration are the main contributors.[1]In the developing world infectious keratitis is a leading cause of prolonged ocular morbidity and visual loss.[2]In India,approximately 6.8 million people suffer from corneal blindness.Out of these,1 million have bilateral corneal blindness.It has been estimated that number of people afflicted from corneal blindness in India will increase to 10.6 million by 2020.[3]Reported incidence of corneal ulceration in India is 1130 per million population.[4]In order to develop a comprehensive strategy for the diagnosis,treatment and for prevention of corneal

infections,the aetiological factors predisposing to corneal ulcer and the pathogenic organisms which are responsible must be determined.The purpose of present study is to evaluate all suppurative keratitis seen at our hospital over a period of two years.Microbial keratitis, is potentially blinding and is a major cause of ocular morbidity if appropriate treatment is not initiated promptly. Intensive broad-spectrum therapy is usually started before laboratory culture results are available.Specific therapy should be based on laboratory reports which identify the causative agents and provide antibacterial susceptibility results.Present study is an attempt to identify the epidemiological pattern of suppurative keratitis and the specific microbial agents causing suppurative kearatitis.

## MATERIALS AND METHODS

This is a cross sectional study undertaken over a period of two year carried out at the Pravara Rural Hospital, Loni. All Adult Patients 18 to 75 years age with suppurative keratitis at Pravara Rural Hospital, Loni with signs and symptoms of infectious corneal ulcer such as pain,redness,watering of the eye, decreased vision and photophobia were included in the study.

## SPECIMEN COLLECTION

All patients with suppurative keratitis underwent thorough ocular and systemic examination. Written consent to participate in the study was obtained from the patients or their guardians after providing full explanation of the study.

 After getting informed consent, few drops of local anaesthetic like 4% xylocaine was instilled into the affected eye and scrapings were taken by means of a sterile number 15 Bard Parker surgical blade from leading edge and base of the ulcer.The material was smeared on two slides,one for Gram stain and other for 10% potassium hydroxide (KOH) wet mount.[5,6] For culture and sensitivity,the material was also directly inoculated by multiple C-shaped streaks on blood agar and Sabouraud's dextrose agar with chloramphenicol(50 mg/ml). The laboratory diagnosis was performed using standard protocols. The inoculated plate of blood agar was incubated at 37oC and was evaluated at 24 and 48 hours. They were subsequently discarded at 48 hour if no growth was observed. The inoculated SDA media for fungi was incubated at 25oC and examined daily. It was discarded after 10 days if no growth was present. Identification of growth on SDA was done by lactophenol cotton blue stain,by pigment production and by the morphological appearance of hyphae and spores.[7]

**RESULTS:**

70 patients of corneal ulcer were studied over a period of two years in Pravara rural hospital,Loni. The detailed findings of these cases are tabulated as follows:

**Table 1: Age distribution of patients**

| Sr.no. | Age (Years) | No.of cases | Percentage |
|--------|-------------|-------------|------------|
| 1 | <20 | 3 | 4.28 |
| 2 | 21-40 | 12 | 17.14 |
| 3 | 41-60 | 33 | 47.14 |
| 4 | >60 | 22 | 31.42 |
| | Total | 70 | 100 |

This table shows that the age group of 41-60 years was more affected.

Out of total of 70 patients,38 patients were male and 32 patients were female,showing that males are at higher risk of developing corneal ulcer.

**Table 2: Occupation of patients**

| Sr.no. | Occupation | No.of cases | Percentage |
|--------|-----------|-------------|------------|
| 1 | Farmer | 41 | 58.57 |
| 2 | Manual labourer | 13 | 18.57 |
| 3 | Housewife | 11 | 15.71 |
| 4 | Others | 5 | 7.15 |
| | | 70 | 100 |

The above table shows the most of the patients were farmers (58.57%),followed by manual labourers(18.57%).This was followed by Housewives(15.71%)and other professions like students and clerks(7.15%).

**Table 3: Predisposing factors**

| Sr.no | History given | Number of cases | Percentage |
|-------|---------------|-----------------|------------|
| 1 | Foreign body | 17 | 24.29 |
| 2 | Vegetative trauma(leaf ,wood ,stick etc.) | 37 | 52.84 |
| 3 | Trauma with other agents | 2 | 2.86 |
| 4 | Follicular conjunctivitis | 4 | 5.72 |
| 5 | Unknown object | 3 | 4.29 |
| 6 | No specific history | 7 | 10 |
| | **Total** | 70 | 100 |

Many patients gave history of trauma to the eye with various agents.Trauma with vegetative matter was most commonly seen.

**Table 4: Ulcer Type**

| Sr.no. | Ulcer Type | No.of Cases | Percentage |
|---|---|---|---|
| 1 | Fungal | 18 | 25.71 |
| 2 | Bacterial | 10 | 14.28 |
| 3 | Mixed | 4 | 5.71 |
| 4 | Sterile | 38 | 54.28 |
| | Total | 70 | 100 |

This table shows that fungal keratitis was the most commonly seen in 18 patients accounting for 25.71% of the total patients,followed by bacterial in 14.28%,mixed in 5.71% and culture was sterile in 54.28%.

**Table 5: Organisms isolated on culture**

| Sr.no. | Organisms isolated | No.of Cases | Percentage |
|---|---|---|---|
| 1 | Fusarium  species | 12 | 54.53 |
| 2 | Aspergillus species | 7 | 31.83 |
| 3 | Candida species | 3 | 13.64 |
| | Total | 22 | 100 |

After 2 weeks of inoculation of SDA medium the commonest fungal organism isolated was Fusarium (54.53%),followed by Aspergillus spp (31.83%) and candida (13.64%).

**Table 6: Organisms isolated on culture**

| Sr.no. | Organisms isolated | No.of Cases | Percentage |
|---|---|---|---|
| 1 | Staphylococcus aureus | 5 | 35.71 |
| 2 | Staphylococcus epidermidis | 2 | 14.28 |
| 3 | Streptococcus pneumoniae | 4 | 28.57 |
| 4 | Pseudomonas | 2 | 14.28 |
| 5 | Enterobactor | 1 | 7.14 |
| | Total | 14 | 100 |

Among the 14 patients positive for bacteria , Staphylococcus aureus was isolated in 5(35.71) patients,Streptococcus pneumoniae 4(28.57%) patients, Staphylococcus epidermidis 2(14.28%) and pseudomonas 2(14 .28%) patients,while 1(7.14%)patients tested positive for enterobactor species.

**DISCUSSION**

Cornea,being the most anterior part of the eyeball,is exposed to the atmosphere and thus remains prone to various infections. In this study table 1 shows the age distribution of patients having various corneal ulcers.Out of 70 patients studied the commonest age group affected was between  41-60 years .This is consistent with the results of

Cameron et al [8] in Sydney and Das et al [9] in Kolkata.The age distribution could be attributed to the higher percentage of patients in this age group being involved in agriculture practices.[10]

As per table 2 in this study males (54.28%) were affected more than females (45.71%) that is male:female ratio in our study group is 38:32(1.18:1) which shows that males were more affected than females,which could be attributed to the increased outdoor activity of men hereby increasing their vulnerability to the disease.This correlates with many studies like Sood et al[4] which shows male:female ratio was 1.4:1.Bharathi et al [11] found that out of total,60.08% were males and Basak et al[12] in their study found 70.6% males and 29.4% females,which means that males were more affected than females.

According to table 3 farmers were at risk for developing corneal ulcers .This may be due to the increased risk of injuries that occur while working in field.Present study correlates with most of the studies . The remaining patients affected were manual labourers (18.57%),housewives 11(15.71%) and others category 5(7.14%) comprised of students and clerks.

According to Table 4 history of trauma(55.7%) was the most common factor ,followed by history of foreign body in the eye (24.29%),followed by conjunctivitis (5.72%),unknown object (4.29%)and no specific history (10%).Our data correlates with Panda et al,which shows 55.3% have history of trauma.History of vegetative trauma was found in 52.84% cases.This could be due to the fact that most of the patients were farmers which were more prone to injuries with vegetative matter while working in fields.

Table 5 shows that out of all keratitis cases,fungal keratitis (25.71%) was most commonly seen,followed by bacterial (14.28%), mixed (5.71%) and culture was sterile in 54.28% cases.**Basak et al (2005)[12]** in their study found fungal growth in 42.5% cases whereas our findings show 25.71% which shows that fungal growth was higher in both the findings.In their study pure bacterial growth was 15.3% and our study found 14.28% of the same which is correlates to their findings.Basak et al revealed 9.5% patients had mixed growth which is partly in correlation with our study in which 5.71% patients revealed mixed growth.In our study commonest fungal organism isolated was Fusarium accounting for 54.54% cases.

In this study the next common organisms were Aspergillus in 31.81% and candida in 13.63% cases.Our study shows that most common Gram positive bacteria isolated was staphylococcus aureus accounting for 35.71%, followed by streptococcus pneumonia (28.57%), staphylococcus epidermidis (14.28%). Among Gram negative organisms we found pseudomonas (14.28%),followed by Enterobacter (7.14%). Vegetative trauma is the most common predisposing factor for suppurative keratitis in rural population.Fungal ulcers are more common than bacterial ulcers.Commonest fungal isolates is Fuasarium and most common bacterial isolate is Staphylococcus aureus.

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