

## Assessment of cases of infective keratitis

Divya Kumari<sup>1</sup>, Pinki Kumari<sup>2\*</sup><sup>1</sup>Senior Resident, Department of Ophthalmology, AIIMS Patna, Bihar, India<sup>2</sup>Senior Resident, Department of Ophthalmology, AIIMS Patna, Bihar, India

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**Abstract**

**Background:** A variety of factors determine clinical outcome in microbial keratitis and the epidemiological patterns vary from one country to the other and in different geographical areas in the same country. The present study was conducted to assess cases of infective keratitis. **Materials & Methods:** 76 patients diagnosed with infective keratitis of both genders were enrolled. Scrapings were subjected to Gram stain, potassium hydroxide preparation and culture for bacterial and fungal pathogens. **Results:** Out of 76 patients, males were 46 and females were 30. Micro-organisms found to be bacterial isolates in 54, fungal growth in 12 and no organism isolated in 10 cases. Bacterial isolates were staphylococcus aureus in 12, coagulase-negative staphylococci in 14, Micrococcus in 10, Klebsiella spp in 10 and Pseudomonas spp in 8. Fungus found to be curvularia spp in 2, aspergillus spp in 1, fusarium spp in 2, unidentified in 2 and candida spp in 5. The difference was significant ( $P < 0.05$ ). **Conclusion:** Staphylococcus aureus, coagulase-negative staphylococci and candida spp. Were most commonly involved pathogen in infective keratitis.

**Keywords:** Staphylococcus aureus, Candida spp, infective keratitis

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**Introduction**

Keratitis is the term applied for inflammations of the cornea. Corneal infections are known to be the second most significant cause of monocular blindness rated after unoperated cataract in some developing nations in particular and in the tropics in general[1]. Microbial keratitis is a common, potentially vision threatening ocular infection that may be caused by bacteria, fungi, viruses or parasites. Emphasizing the importance of corneal ulceration[2].

A variety of factors determine clinical outcome in microbial keratitis and the epidemiological patterns vary from one country to the other and in different geographical areas in the same country. Several studies have evaluated the etiology, management, and outcome of microbial infectious[3]. However, there are regional variations in the prevalence, risk factors, and outcome in corneal ulcers. For example, infective corneal ulcers appear to be occurring in epidemic pattern and being 10 times more common in the developing world than in the developed countries[4]. The clinical diagnosis of infective keratitis does not give an unequivocal indication of the causative organisms because a wide range of organisms can produce a similar clinical picture. Culture and direct microscopic detection of causative organisms are the two important microbiological investigations that are widely used. To minimize ocular morbidity, timely antimicrobial treatment must be initiated on the basis of clinical and microbiological evaluation[5]. The present study was conducted to assess cases of infective keratitis.

\*Correspondence

**Dr. Pinki Kumari**

Senior Resident, Department of Ophthalmology, AIIMS Patna, Bihar, India.

E-mail: [pinkipmch15@gmail.com](mailto:pinkipmch15@gmail.com)**Materials & Methods**

The present study comprised of 76 patients diagnosed with infective keratitis of both genders. All were part of the study with their written consent.

Demographic profile of each patient was recorded. All patients were examined under slit-lamp bio-microscope by an ophthalmologist. Corneal scraping was performed under strict aseptic conditions by an ophthalmologist using a sterile Bard-Parker blade. Prior to obtaining the scraping, preservative-free 4% lignocaine hydrochloride was instilled. Subsequently, material was obtained from scraping of the leading edge and base of each ulcer. Scrapings were subjected to Gram stain, potassium hydroxide preparation and culture for bacterial and fungal pathogens. Results of the study was assessed statistically.

**Results****Table 1; Distribution of patients**

Total- 76		
Gender	Males	Females
Number	46	30

Table I shows that out of 76 patients, males were 46 and females were 30.

**Table 2: Causative micro-organisms responsible for corneal ulcers**

Micro-organisms	Number	P value
Bacterial isolates	54	0.03
Fungal growth	12	
No organism isolated	10	

Table II, graph I shows that micro-organisms found to be bacterial isolates in 54, fungal growth in 12 and no organism isolated in 10 cases. The difference was significant ( $P < 0.05$ ).

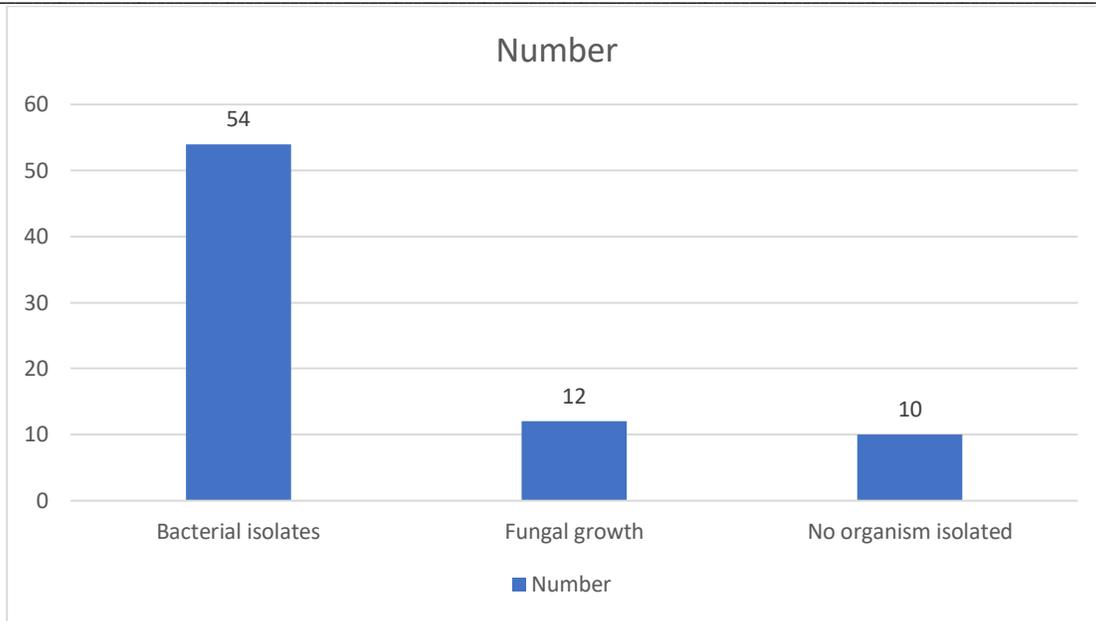


Fig 1: Causative micro-organisms responsible for corneal ulcers

Table 3: Bacterial and fungal isolates

Isolates	Organism	Number	P value
Bacterial	Staphylococcus aureus	12	0.01
	Coagulase-negative Staphylococci	14	
	Micrococcus	10	
	Klebsiella spp	10	
	Pseudomonas spp	8	
Fungus	Curvularia spp	2	0.05
	Aspergillus spp	1	
	Fusarium spp	2	
	Unidentified	2	
	Candida spp	5	

Table III, graph II shows that bacterial isolates were staphylococcus aureus in 12, coagulase-negative staphylococci in 14, Micrococcus in 10, Klebsiella spp in 10 and Pseudomonas spp in 8. Fungus found to be curvularia spp in 2, aspergillus spp in 1, fusarium spp in 2, unidentified in 2 and candida spp in 5. The difference was significant ( $P < 0.05$ ).

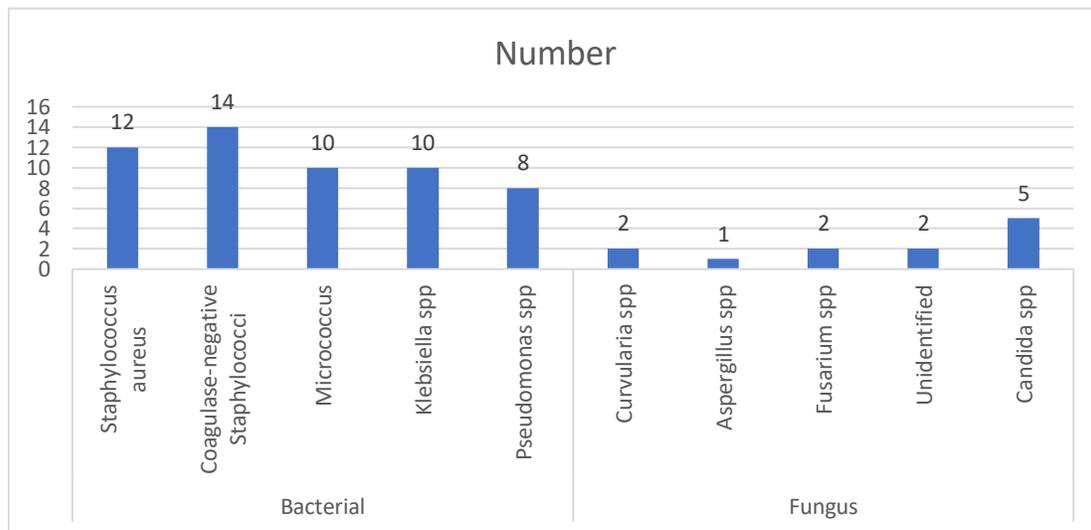


Fig 2: Bacterial and fungal isolates

### Discussion

Infectious keratitis is an important preventable cause of monocular blindness worldwide. It is considered an ocular emergency that requires prompt and appropriate management to ensure the best visual outcome for the patient[6]. The etiological and epidemiological patterns of corneal ulceration have been found to vary with the patient population, health of the cornea, geographic location and climate, and also tends to vary over time[7]. Hence, an understanding of the epidemiological features, risk factors and etiological agents that occur in a specific region are important in rapid recognition, timely institution of therapy, optimal management and prevention of this disease[8]. In order to start specific therapy, it is necessary to do meticulous laboratory investigations, and this includes microscopy and culture of corneal scrapings for identification of the microbial agent[9]. The present study was conducted to assess cases of infective keratitis.

In present study, out of 76 patients, males were 46 and females were 30. Tewari et al[10] in their study a total of 150 corneal scrapings were evaluated from patients presenting with corneal ulcers. Scrapings were subjected to Gram stain, potassium hydroxide preparation and culture for bacterial and fungal pathogens. Socio-demographic data and risk factors were recorded. Ninety percent (135/150) people with corneal ulcers had trauma as predisposing factor for keratitis. Trauma due to wooden objects was the leading cause (46/135) followed by vegetable matter and stone injury (23/135). Microbial etiology was established in 59.3% (89/150) of scrapings. Out of 89 positive isolates, 65.1% (58/89) were bacterial while 34.9% (31/89) were fungal. Among the bacterial isolates, 60.3% (35/58) were Gram-positive cocci while 39.7% (23/58) were Gram-negative bacilli. The most common bacterial isolate was *Staphylococcus aureus* (32.7%, 19/58) followed by coagulase-negative *Staphylococci* (25.8%, 15/58) and *Pseudomonas* (18.9%, 11/58). Among the 31 fungal pathogens, *Aspergillus* species was the most common (35.4% 11/31), followed by *Fusarium* species (22.5%, 7/31). We found that micro-organisms found to be bacterial isolates in 54, fungal growth in 12 and no organism isolated in 10 cases. Gopinathan et al[11] determined epidemiological characteristics, microbiological profile, and treatment outcome of patients with suspected microbial keratitis. Out of 5897 suspected cases of microbial keratitis 3563 (60.4%) were culture-proven (bacterial  $\bar{n}$  1849, 51.9%; fungal  $\bar{n}$  1360, 38.2%; *Acanthamoeba*  $\bar{n}$  86, 2.4%; mixed  $\bar{n}$  268, 7.5%). Patients with agriculture-based activities were at 1.33 times greater risk of developing microbial keratitis and patients with ocular trauma were 5.33 times (CI 6.41-6.44) more likely to develop microbial keratitis. Potassium hydroxide with calcofluor white was most sensitive for detecting fungi (90.6%) and *Acanthamoeba* (84.0%) in corneal scrapings, however, Gram stain had a low sensitivity of 56.6% in detection of bacteria. Majority of the bacterial infections were caused by *Staphylococcus epidermidis* (42.3%) and *Fusarium* species (36.6%) was the leading cause of fungal infections. A significantly larger number of patients (691/1360, 50.8%) with fungal keratitis required surgical intervention compared to bacterial (799/1849, 43.2%) and *Acanthamoeba* (15/86, 17.4%) keratitis. Corneal healed scar was achieved in 75.5%, 64.8%, and 90.0% of patients with bacterial, fungal, and *Acanthamoeba* keratitis respectively. We observed that bacterial isolates were *staphylococcus aureus* in 12, coagulase-negative *staphylococci* in 14, *micrococcus* in 10, *Klebsiella*

spp in 10 and *Pseudomonas* spp in 8. Fungus found to be *curvularia* spp in 2, *aspergillus* spp in 1, *fusarium* spp in 2, unidentified in 2 and *candida* spp in 5. Basak et al[12] found vegetative matter, chiefly paddy and jute, as the principal traumatic agent for the development of keratitis. There was a higher incidence of keratitis among housewives (21.3%), followed by farmers (16.6%), laborers (14.6%) and carpenters (10.6%) in this study. Injury with wooden objects and vegetable matter representing farmers coincides well with other studies.

### Conclusion

Authors found that *staphylococcus aureus*, coagulase-negative *staphylococci* and *candida* spp. Were most commonly involved pathogen in infective keratitis.

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