

## PATHOGENIC BACTERIA ASSOCIATED WITH CASES OF CORNEAL ULCERS

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### ABSTRACT

Number of blind people in the world is 45 million. Out of which 5.4 million blind people are in our country. Corneal ulcer is a major cause of blindness throughout the world. About 10% cases of blindness are due to corneal ulcer. "Corneal Ulcer means loss of corneal substances as a result of infection and formation of raw, excavated area." Corneal Ulcers can be caused by exogenous infections i.e. by viruses, bacteria, fungi or parasites and sometimes it is allergic in nature or it can be due to endogenous infections. Almost any organism can invade the corneal stroma if the normal corneal defense mechanisms, i.e., lids, tear film and corneal epithelium are compromised. Bacterial keratitis is serious ocular infectious disease that can lead to significant vision loss. Isolation and identification of pathogenic bacteria associated with cases of corneal ulcers during period of one year.

**KEYWORDS :** Corneal Ulcer, Pathogenic Bacteria, Ophthalmology

Number of blind people in the world is 45 million. Out of which 5.4 million blind people are in our country. Corneal Ulcer is a major cause of blindness throughout the world. About 10% cases of blindness are due to Corneal Ulcer. (Ninama et al., 2011).

Cornea is a clear transparent front part of the eye with a smooth shining surface. That covers Iris, Pupil and anterior chamber. The cornea with the anterior chamber and lens reflects light with the cornea accounting for approximately two-third of the eye's total optical power. Corneal Ulcer means loss of corneal substances as a result of infection and formation of raw, excavated area. (Chatterjee 1988).

Corneal Ulcers can be caused by exogenous infections i.e. by viruses, bacteria, fungi or parasites and sometimes it is allergic in nature or it can be due to endogenous infections. The term keratitis (Corneal Ulcer) had been introduced by "James Wardop" in 1869 in his essay on morbid anatomy of human eye. (Ninama et al., 2011; Chatterjee 1988).

Almost any organism can invade the corneal stroma if the normal corneal defence mechanisms, i.e., lids, tear film and corneal epithelium are compromised. (Garg et al., 1999).

Eighty percent of bacterial corneal ulcers are caused by *Staphylococcus aureus*, *Streptococcus pneumoniae* and *Pseudomonas* species. The ability of an organism to adhere to the edge or base of epithelial defect signatures its pathogenicity. It is a potentially sight-threatening corneal infection in humans that is generally

found in eyes with predisposing elements, the most common of which is contact lens wear. Particular attention should be given to this condition as it can progress very rapidly with complete corneal destruction occurring within 2448 hours. Early diagnosis, which is primarily clinical and substantiated largely by microbiological data, and prompt treatment are needed to minimize the possibility of permanent vision loss and reduce structural damage to the cornea. (Abdullah et al., 2009).

Bacterial keratitis is serious ocular infectious disease that can lead to significant vision loss. The goal of this study is to isolate and identify the pathogenic bacteria from Corneal Ulcers.

### MATERIALS AND METHODS

In assessment to isolate and identify the pathogenic bacteria from Corneal Ulcer, present work was under taken.

#### Collection of samples

A total of 100 samples were collected during period of June 2013 to March 2014 from ophthalmology hospital, government hospital and clinical laboratories.

#### Enrichment of samples

Samples were collected in sterile container containing 0.5ml of Brain Heart Infusion Broth (BHI) as enrichment culture medium that supports the growth of bacteria and then transferred immediately to laboratory for further processing. (Kaye et al., 2003)

#### Isolation and identification of pathogenic bacteria

After incubation loopful of each enriched culture

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was streaked on CLED agar and Nutrient agar plates were incubated at 37°C for 24 hours. Colonies with different morphological characters and Gram's characters were selected and inoculated on respective selective media viz. Blood agar, Mannitol salt agar, Cetrinide agar, Pseudomonas isolation agar (Hi- media), EMB (Eosin Methylene Blue) agar, CLED (Cystine-Lactose-Electrolyte-Deficient) agar, MacConkey agar. All the plates were incubated at 37°C for 24 hours.

All the suspicious screened colonies of *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae* were then analyzed for their biochemical character viz. Carbohydrate fermentation, IMViC, Enzymes etc. by inoculating into respective media. Further their identification was confirmed by Morphological, Biochemical and Cultural characteristics.

**RESULTS AND DISCUSSION**

In present study 100 samples were collected during period of June 2013 to March 2014. The patients were of both sex and age groups varying from 20 to 70

years. Out of 100 samples, bacteria were isolated from 37 samples. Maximum cases of bacterial ulcers occurred in the age group of 31 to 60 years. Thus 30 (81.08%) patients were in the age group between 31 to 60 years. Out of total 37 bacterial ulcers 22 (59.46%) were seen in male and 15(40.54%) were seen in female. (Table 1)

A total of 68 isolates of *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae* isolated from 37 samples. Among 68 isolates 31 were *Staphylococcus aureus*, 22 were *Pseudomonas aeruginosa*, 15 were *Klebsiella pneumoniae*. (Table 2 and Graph 1)

The organisms were identified based on the colony morphology and biochemical reaction. *S. aureus* isolates are

**Table 1 : Distribution of Bacterial Isolates According Age and Sex**

Age (yrs)	Male	Female	Total
0-10	00	00	00
11-20	01	00	01
21-30	02	01	03
31-40	09	06	15
41-50	03	01	04
51-60	06	05	11
61-70	01	02	03
71-80	00	00	00
81-90	00	00	00
Total	22	15	37



**Graph 1 : Frequency distribution of *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* isolation from clinical samples**

**Table 2 : Frequency Distribution of *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* Isolation From Clinical Samples**

Sr. No.	Name of Organism	No. of Isolates	No. of Isolates (%)
1.	<i>Staphylococcus aureus</i>	31	45.59
2.	<i>Pseudomonas aeruginosa</i>	22	32.35
3.	<i>Klebsiella pneumoniae</i>	15	22.06

confirmed based on yellowish colony coloration and pigmentation on Mannitol salt agar and golden yellow colonies on Milk agar. *P. aeruginosa* isolates are confirmed based on colony coloration or pigmentation i.e. blue-green colony due to pyocyanin pigment and yellow-green colony due to fluorescent pigmentation or also known as pyoverdinin on selective media i.e. Cetrimide agar and *Pseudomonas* isolation agar. *K. pneumoniae* isolates are confirmed based on pale yellowish mucoid colonies on CLED agar and pink mucoid colonies on MacConkey agar.

The ability of an organism to adhere to the edge or base of an epithelial defect signature its pathogenicity. Membrane appendages such as fibrillae in Gram-positive organisms, fimbriae and glycocalyx in Gram-negative bacteria help these organisms adhere to damaged epithelial cells and stroma. (Abdullah et al., 2009)

In these studies it is observed that in bacterial ulcers, males affected more than females. Our results are in accordance with Ninama et al., 2011. They observed all these organisms such as *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*. Also in their studies maximum bacterial ulcers occurred in 31 to 60 years of age.

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