

## Antibiotic Sensitivity Pattern Of Causative Bacterial Pathogens Responsible For Corneal Ulcer

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**Abstracts:** Introduction: 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. Aim: To detect antibiotic sensitivity Pattern of causative bacteria responsible for corneal ulcer. Material and method: 150 samples were collected during period of 1 year from clinically diagnosed cases of corneal ulcer at SSG Hospital, Baroda. Results: Total 150 samples were tested for antibiotic sensitivity pattern and among them Gram positive bacteria showed highest sensitivity to ciprofloxacin and among Gram negative bacteria showed highest sensitivity to ciprofloxacin, gatifloxacin and amikacin while pseudomonas showed highest sensitivity to imepenem [Ninama G et al NJIRM 2012; 3(4) : 76-79]

**Key Words:** Corneal ulcer, Suppurative keratitis, Ophthalmology, Antibiotics

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**Introduction:** 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.<sup>1,2</sup> 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.<sup>3</sup> The frequency of fungal keratitis has increased over the past 20 to 30 years<sup>3,4</sup> especially with the advent of corticosteroid therapy, when improperly initiated. The steroids allow the fungi to prosper and gain a more substantial foothold in the cornea<sup>4,5,6</sup>. Secondary fungal keratitis occurs in immunocompetent persons. It has been realized that a significant percentage of suppurative keratitis is caused by fungi.<sup>1</sup>

Progress of human beings occurs in every field as they pass on their heritage from one generation to another. Generation dies but its knowledge is passed on to the next generation which after confirming the old facts and adding its own experiences in turn passes all these to the next generation. The term keratitis had been introduced by "James Wardop" in 1869 in his essay on morbid anatomy of human eye.<sup>7</sup> Corneal ulcer due to Pneumococci was first established by "Gasparriini, thoff and Axenfield"<sup>8,9</sup>. Different types of Pneumococci were isolated from corneal

ulcetype IV 75%, type III 25%, by Cheney type I, II and IV by Wright and type IV by Schmeltzer<sup>10</sup>. Pseudomonas pyocyanea corneal ulcer was first reported in the literature by Herrheiser and Bietti. Pseudomonas produced perforation and loss of eye of 23 cases reported in the literature in 1936.<sup>11,12</sup> Moraxella, lacunata Corneal ulcer was described by Petil and Morax Axenfeld<sup>13</sup>. Corneal ulcer due to anaerobic clostridium was first described by Pringle. The corneal ulcer due to Tubercle bacilli was described by Roy and Alvarez and Panas and Vassaux.<sup>14</sup>

**Bacterial corneal ulcer:** McNabb reported Pneumococci in 16 (64%), Staphylococci in 5 (20%), Streptococci in 1(4%), Diplococci in one (4%) and no organisms in two cases.<sup>15</sup> Thygeson reported Pneumococci in 70% and gram negative bacilli in 18% of cases in his study. 21 Pseudomonas is also important causative organism for corneal ulcer. Cassady in the study of 50 cases, he had stressed the importance of Pseudomonas pyocyanea in corneal ulcer. He found Pseudomonas pyocyanea in 9 cases, Staphylococci in 4 cases, Haemophilus influenzae in 1 case, Streptococci in 2 cases, Diphtheroid in 2 cases, Diplobacillus pneumoniae in 1 case, Klebsiella pneumoniae in 1 case, coagulase negative. Staphylococci in 13 cases and no organisms isolated in 17 cases. He found Pseudomonas was highly sensitive to polymyxin-B.2, Most corneal ulcers are caused by infections.

Bacterial infections cause corneal ulcers and are common in people who wear contact lenses. Viral infections are also possible causes of corneal ulcers. Such viruses include the herpes simplex virus.

Fungal infections can cause corneal ulcers and may develop with improper care of contact lenses or the overuse of eyedrops that contain steroids.

Tiny tears to the corneal surface may become infected and lead to corneal ulcers. These tears can come from direct trauma by scratches or metallic or glass particles striking the cornea. Such injuries damage the corneal surface and make it easier for bacteria to invade and cause a corneal ulcer. Disorders that cause dry eyes can leave your eye without the germ-fighting protection of tears and cause ulcers.

People who wear contact lenses are at an increased risk of corneal ulcers. The risk of corneal ulcerations increases tenfold when using extended-wear soft contact lenses. Extended-wear contact lenses refer to those contact lenses that are worn for several days without removing them at night. Contact lenses may damage your cornea in many ways.

**Material And Method:** 150 patients were examined and their samples were collected after their verbal consent during period of 1 year from 2004 to 2005 from clinically diagnosed cases of corneal ulcer at Ophthalmology department, SSG Hospital, Baroda. However the samples were collected as a part of investigation and treatment of patients, so the permission of institution not needed. The patients were of both sex and age groups varying from 2 to 70 years, outpatient department as well as indoor patients. The Pretested Performa was used. Microbiological Investigations were done by using following test, gram stain, KOH preparation, aerobic culture and sensitivity.

Antimicrobial disc susceptibility test: A 0.5 McFarland standard is prepared for a single time.<sup>17</sup> Mueller-Hinton agar was prepared from

commercially available dehydrated base according to manufacturer's instructions. As per the CLSI guidelines three to five well isolated colonies of same morphology were selected from the Nutrient agar plate. The top of each colony were touched with a loop and the growth is transferred to Peptone water broth. The broth is then incubated at 37°C. The turbidity of the broth is checked every hour and compared with 0.5 McFarland Standard. Before inoculating every plate to observe antibiotic susceptibility test, Mueller-Hinton culture plates were placed in incubator at 37°C and kept for 30 minutes to ensure minimum surface moisture. Antimicrobial susceptibility of all the isolates was performed by the disc-diffusion<sup>17</sup>.

**Results and Discussion:** 150 samples were collected during period of 1 year from clinically diagnosed cases of corneal ulcer at SSG Hospital, Baroda.

The most common isolate staphylococcus aureus, pseudomonas, other organism are Coagulase negative Staphylococcus spp.

The sensitivity pattern changes from hospital to hospital and population to population. It also indicates the importance of study of sensitivity, as emphasized by various international authorities that every hospital should have its individual antibiotic sensitivity pattern since the standard antibiotic sensitivity pattern may not follow to every area.

The most common isolate staphylococcus aureus was found highly sensitive to Vancomycin (95%), followed by Roxithromycin (80%), Ciprofloxacin (75%), Cefotaxime (70%), Ofloxacin (65%), Amoxyclave (60%), Erythromycin (55%). The incidence of MRSA was 75% while Coagulase negative Staphylococcus spp. shown good sensitivity to Vancomycin (100%, Roxithromycin (71.43%) & Ciprofloxacin (71.43%).

V. H. Madhavan<sup>10</sup> reported that staphylococcus aureus were most sensitive to cloxacillin and next was chloramphenicol. Penicillin was least effective.

In the study of Douglas J. Coster<sup>16</sup> staphylococcus aureus was most sensitive to cephalosporin, chloramphenicol and gentamycin with 100% sensitivity.

In the present study, the commonest gram negative organism, pseudomonas was most sensitive to Imipenem (100%), seen with Piperacillin (88.89%), Piperacillin + Tazobactam (88.89), Ticarcilin + Clauvulanic acid (88.89%), Amikacin (66.67%) and Lomefloxacin (66.67%). According to V. H. Madhavan<sup>8</sup> Pseudomonas sp. was most sensitive to chloramphenicol and least sensitive to penicillin.

Douglas J. Coster<sup>10</sup> found Pseudomonas to be most sensitive to gentamycin, tobramycin and carbenicillin (100%) and less sensitive to cephadroxy and chloramphenicol. In the study of Maniknandan P. et al<sup>8</sup> Coagulase negative Staphylococcus was highly sensitive to Ampicillin and Vancomycin.

Smitha S et al<sup>9</sup> has mentioned decreasing sensitivity of pseudomonas to ciprofloxacin & increasing sensitivity to ofloxacin & aminoglycosides over period of 8 yrs.

**Conclusion:** 150 samples were collected during period of 1 year from clinically diagnosed cases of corneal ulcer at SSG Hospital, Baroda. The most common isolate staphylococcus aureus was found highly sensitive to Vancomycin (95%), followed by Roxithromycin (80%), Ciprofloxacin (75%), Cefotaxime (70%), Ofloxacin (65%), Amoxyclave (60%), Erythromycin (55%). The incidence of MRSA was 75% while Coagulase negative Staphylococcus spp. shown good sensitivity to Vancomycin (100%, Roxithromycin (71.43%) & Ciprofloxacin (71.43).

**Future Guidelines:** Seek medical attention from your ophthalmologist immediately for any eye symptoms. Even seemingly minor injuries to your cornea can lead to an ulcer and have devastating consequences, including blindness or loss of the eye. Wear eye protection when exposed to small particles that can enter your eye.

If you have dry eyes or if your eyelids do not close completely, use artificial teardrops to keep your eyes lubricated. If you wear contact lenses, be extremely careful about the way you clean and wear your lenses.

Always wash your hands before handling the lenses. Never use saliva to lubricate your lenses because your mouth contains bacteria that can harm your cornea. Remove your lenses from your eyes every evening and carefully clean them. Never use tap water to clean the lenses. Never sleep with your contact lenses in your eyes. Store the lenses in disinfecting solutions overnight. Remove your lenses whenever your eyes are irritated and leave them out until your eyes feel better. Regularly clean your contact lens case.

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