Assessment of Incidence of Bacterial Pathogens Causing Ocular Infections: An Observational Study

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ABSTRACT
Background: Bacteria contribute for major etiologic component for ocular pathologies. Bacterial conjunctivitis is commonly seen in children and the elders but can also be presented among neonates and adults. Hence; we planned the present study to assess the incidence of bacterial pathogens causing ocular infections.

Materials & Methods: The present study included assessment of incidence of bacterial pathogens causing ocular infections. A total of 100 patients (eyes) were included in the present study. Evaluation of all the patients was done, who reported to the department of ophthalmology. All the patients were examined slit-lamp bio-microscope and bacterial infections were diagnosed by experienced and skilled ophthalmology. All the results obtained were summarized and assessed by SPSS software.

Results: Commonly seen ocular infection in the present study was Blepharitis, ulcerative scleratitis, ulcerative keratitis and corneal infection. Gram positive cocci were the most commonly isolated bacterial specimens in the present study. Among these gram positive cocci, the most commonly isolated were S. aureus, S. pneumoniae, S. pyogenes and S. viridans. Gram positive bacilli were the most common bacterial pathogen seen, after gram positive cocci. Among them, most commonly encountered were bacillus spp. and corynebacterium spp.

Conclusion: Gram positive cocci are the most commonly obtained bacterial specimens in patients with ocular infections.

Key words: Bacterial, Incidence, Ocular.

INTRODUCTION
The human eye which is relatively impermeable to most environmental agents is one of the most complex sensory organs of the human body. However, in certain circumstances, infectious agents gain access into the eye, following different routes and cause infection. Trauma, surgery and systemic diseases are among the contributing factors as routes of entry for infectious agents.1,2 Conjunctivitis, inflammation of the mucosa of conjunctiva, is the most frequent ocular case with noticeable economic and social burdens. During chronicity, the disease can affect not only the conjunctiva but also adjacent structures including the eye lid and can be a potential risk for other extra or intraocular infections.3,4 Bacteria contribute for about 50–70% of infectious conjunctivitis. Bacterial conjunctivitis is commonly seen in children and the elders but can also be presented among neonates and adults.5,6 Hence; we planned the present study to assess the incidence of bacterial pathogens causing ocular infections.

MATERIALS & METHODS
The present study was planned in the Department of Ophthalmology, Amaltas Institute of Medical Sciences, Dewas, Madhya Pradesh (India) and it included assessment of incidence of bacterial pathogens causing ocular infections. A total of 350 (eyes) patients were included in the present study. Evaluation of all the patients was done, who reported to the department of ophthalmology. Exclusion criteria for the present study included:
- Subjects less than 20 years of age, or more than 60 years of age,
- Subjects with positive history of any other systemic illness,
- Subjects with presence of any form hypersensitive reaction
All the patients were examined slit-lamp bio-microscope and bacterial infections were diagnosed by experienced and skilled ophthalmology. Detailed ocular examination was carried out in all the patients. Culture and smear were obtained from all the patients by using scraping and swabbing the margin eyelid. Sheep
blood agar, chocolate agar and non-nutrient agar were used for culturing the obtained specimens. All the results obtained were summarized and assessed by SPSS software. Chi-square test was used for assessment of level of significance.

RESULTS
In the present study, we assessed a total of 350 patients, with mean age of 31.5 years. There were 100 patients of less than 25 years of age. There were 150 patients within age group of 25 to 40 years. There were 100 patients more than 40 years of age.

There were 210 males and 140 females in the present study. Commonly seen ocular infection in the present study was Blepharitis, ulcerative scleratitis, ulcerative keratitis and corneal infection. Gram positive cocci were the most commonly isolated bacterial specimens in the present study. Among these gram positive cocci, the most commonly isolated were S. aureus, S. pneumoniae, S. pyogenes and S. viridans. Gram positive bacilli were the most common bacterial pathogen seen, after gram positive cocci. Among them, most commonly encountered were bacillus spp. and corynebacterium spp.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Age group</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td>Age group</td>
<td>Less than 25 years</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>25 to 40 years</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>More than 40 years</td>
<td>100</td>
</tr>
<tr>
<td>Gender</td>
<td>Males</td>
<td>210</td>
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<tr>
<td></td>
<td>Females</td>
<td>140</td>
</tr>
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</table>

Table 2: Bacteriological profile of ocular specimens

<table>
<thead>
<tr>
<th>Name of bacterial specimen</th>
<th>Gram positive cocci</th>
<th>Gram positive bacilli</th>
<th>Gram negative cocci</th>
<th>Gram negative bacilli</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S. aureus 30</td>
<td>Bacillus spp. 2</td>
<td>Moraxella spp. 1</td>
<td>Pseudomonas spp. 0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>S. pneumoniae 15</td>
<td>Corynebacterium spp. 1</td>
<td>Neisseria spp. 2</td>
<td>E. coli 1</td>
<td>10</td>
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<tr>
<td></td>
<td>S. pyogenes 3</td>
<td></td>
<td></td>
<td>Proteus spp. 0</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>S. viridans 1</td>
<td></td>
<td></td>
<td>Klebsiella spp. 0</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Others 0</td>
<td>10</td>
</tr>
</tbody>
</table>

DISCUSSION
In the present study, we assessed a total of 350 patients, with mean age of 31.5 years. Ramesh S et al identified the specific bacterial pathogens causing ocular infections and to determine their in-vitro antibacterial susceptibilities to commonly used antibacterial agents. A retrospective analysis of all patients with clinically diagnosed bacterial ocular infections such as blepharitis, conjunctivitis, internal and external hordeolum, suppurrative scleritis, canaliculitis, keratitis, dacryocystitis, preseptal cellulitis, endophthalmitis and panophthalmitis presenting between January 2005 and December 2005 was performed. Extra-ocular and intra-ocular specimens were collected and were subjected to direct microscopy and culture. A total of 756 patients with bacterial ocular infections were analyzed, of which 462 (61%) eyes had adnexal bacterial infection, 217 (28.7%) had corneal infection, 6 (0.8%) had scleral involvement and the remaining 71 (9.39%) eyes had infection of the intra-ocular tissues. The predominant bacterial species isolated was S. aureus (195 of 776; 25%) followed by S. pneumoniae (169 of 776; 21.78%) and coagulase negative staphylococci (142 of 776; 18.3%). The largest number of gram-positive isolates were susceptible to ofloxacin (545 of 624; 87.34%), chloramphenicol (522 of 624; 83.65%) and gatifloxacin (511 of 624; 87.34%), while aerobic actinomycetes were to amikacin (100%), gatifloxacin (14 of 16; 87.5%) and ofloxacin (13 of 16; 81.25%). S. aureus frequently causes infections of eyelids and conjunctiva, S. pneumoniae of lacrimal apparatus and cornea and coagulase negative staphylococci causes intra-ocular infections. There were 100 patients of less than 25 years of age. There were 150 patients within age group of 25 to 40 years. There were 100 patients more than 40 years of age. There were 210 males and 140 females in the present study. Commonly seen ocular infection in the present study was Blepharitis, ulcerative scleratitis, ulcerative keratitis and corneal infection.
ulcerative keratitis and corneal infection. Gram positive cocci were the most commonly isolated bacterial specimens in the present study. Among these gram positive cocci, the most commonly isolated were S. aureus, S. pneumoniae, S. pyogenes and S. viridans. Gram positive bacilli were the most common bacterial pathogen seen, after gram positive cocci. Among them, most commonly encountered were bacillus spp. and corynebacterium spp.

Pathengay A et al presented the microbial spectrum and susceptibility of isolates in scleral buckle infections in India. Seventy-three isolates from 55 eyes with scleral buckle infection were studied. The isolates included 30 gram-positive cocci (41.1%), 15 acid-fast bacilli (20.5%), 11 fungi (15.1%), 10 gram-positive bacilli (13.7%), and 7 gram-negative bacilli (9.6%). Eighteen eyes (32.7%) had polymicrobial infections. Gram-positive, gram-negative, and acid-fast isolates were most commonly susceptible to vancomycin (93%), ciprofloxacin (86%), and amikacin (80%), respectively. This large single-center study indicates the high prevalence of fungal, acid-fast organisms and polymicrobial organisms in buckle infections.10

Bharathi MJ et al determined the influence of risk factors, climate, and geographical variation on the microbial keratitis in South India. A standardised form was filled out for each patient, documenting sociodemographic features and information pertaining to risk factors. Corneal scrapes were collected and subjected to culture and microscopy. A total of 3,183 consecutive patients with infective keratitis were evaluated, of which 1,043 (32.77%) were found to be of bacterial aetiology, 1,095 (34.4%) were fungal, 33 (1.04%) were Acanthamoeba, 76 (2.39%) were Fusarium spp. (35.95%) and Fusarium spp. (41.92%), respectively. Most of the fungi positive, gram-negative, and acid-fast isolates were most commonly susceptible to vancomycin (93%), ciprofloxacin (86%), and amikacin (80%), respectively. This large single-center study indicates the high prevalence of fungal, acid-fast organisms and polymicrobial organisms in buckle infections.10

CONCLUSION
Gram positive cocci are the most commonly obtained bacterial specimens in patients with ocular infections. However; further studies are recommended.

REFERENCES

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