INTRODUCTION

Infective Keratitis (Microbial Keratitis) is infection of the cornea caused by a wide spectrum of microbial agents which is a potentially sight threatening condition [1,2]. According to World health organization (WHO), corneal diseases are among the major causes of vision loss and blindness in the world today, second only to cataract in overall importance. Aim: To isolate and identify the pathogenic organism Method: The study was conducted in 45 patients diagnosed with corneal ulcer attending Ophthalmology OPD, MKCG Medical College and Hospital, Berhampur over a period of 2 months. The material was scraped from the leading edge and base of the ulcer and was inoculated onto Blood agar, Mac conkey agar and Sabouraud Dextrose agar for culture and onto 2 slides for Gram’s stain and 10% KOH wet mount. The susceptibility testing was done by Kirby Bauer’s disc diffusion method. Results: Out of total 45 patients, 35 were males. Majority of the patients belonged to age group of 50-60 years. Pain, Redness, Hypopyon was most commonly seen in Bacterial keratitis. In Fungal Keratitis, Redness (80%), Blurred vision (80%) was seen. Most common occupation was Farmers (66.6%). Trauma was the most common risk factor (23 isolates). Majority were bacterial isolates (29 isolates, 64.4%) followed by fungal (5 isolates, 11.1%). Predominant isolate was Staphylococcus aureus (68.9%). All the gram-positive isolates showed 100% sensitivity to Linezolid and Vancomycin. Conclusion: Knowledge of local prevalence of etiological agents of IK and their susceptibility patterns helps in guiding ophthalmologists to select appropriate antibiotic for empirical therapy.

Keywords: Keratitis; Bacterial keratitis; Staphylococcus aureus; MRSA.
was instilled without preservative. Consent was taken for collection of corneal scrapings.

The material was scraped from the leading edge and base of the ulcer and was inoculated onto Blood agar, Mac Conkey agar and Sabouraud Dextrose agar for culture and onto two slides for Gram’s stain and 10% KOH wet mount [4]. All the inoculated Bacteriological media were incubated at 37°C.

Identification of the organisms was done by following standard protocols. The susceptibility testing was done by Kirby Bauer’s [5] disc diffusion methods as per Clinical and Laboratory Standards Institute guidelines. Cefoxitin (30 microgram disk) was also given to study Methicillin Resistance Staphylococcus aureus by disk diffusion method according to CLSI guidelines [6].

Inoculated Sabouraud Dextrose Agar (SDA) was incubated at 27 °C and were examined daily until three weeks for growth. Fungi were identified by their colony characteristic on Sabouraud dextrose agar and morphological character on Lactophenol cotton blue mount.

RESULTS

Out of a total of 45 patients, 35(77.7%) were males, and 10(22.2%) were females. The most common occupation was Farmers (66.6%) followed by labourers (22.2%), Housewife (11.1%).

Majority of the patients belonged to age group of 50-60 years (33.3%).

| Age group (years) | Number of patients (%) |
|-------------------|-------------------------|
| 10-20             | 2 (4.4)                 |
| 21-30             | 3 (6.6)                 |
| 31-40             | 4 (8.8)                 |
| 41-50             | 6 (13.3)                |
| 51-60             | 15 (33.3)               |
| 61-70             | 7 (15.5)                |
| 71-80             | 8 (17.7)                |

Majority of the patients belonged to age group of 50-60 years (33.3%).

| Symptom         | Bacterial keratitis (N=29) | Fungal keratitis (N=5) |
|-----------------|----------------------------|------------------------|
| Redness         | 26/29(89.6%)               | 4/5(80%)               |
| Pain            | 27/29(93.1%)               | 3/5(60%)               |
| Larcimation     | 25/29(86.2%)               | 3/5(60%)               |
| Photophobia     | 27/29(93.1%)               | 2/5(40%)               |
| Blurred/Diminished vision | 20/29(68.9%) | 4/5(80%) |
| Signs | Lid oedema | 20/29(68.9%) | 1/5(50%) |
| Hypopyon |                | 21/29(72.4%) | 2/5(40%) |
| Conjunctival congestion | 16/24(66.6%) | 3/5(60%) |
| Irregular feathery margins | 12/24(50%) | 4/5(80%) |

| Organism isolated | Number of isolates (%) |
|-------------------|------------------------|
| Bacterial         | 29 (64.4)              |
| Fungal            | 5 (11.1)               |
| Sterile           | 11 (24.4)              |

Trauma was the most common risk factor (23 isolates, 51.1%) followed by History of Prior surgery (13.3%).

| Risk factor                      | No. of isolates |
|----------------------------------|-----------------|
| Trauma                           | 23 (51.1)       |
| H/O antibiotic intake            | 5 (11.1)        |
| Prior surgery                    | 6 (13.3)        |
| H/O Diabetes mellitus            | 4 (8.8)         |
| Contact lens wear                | 3 (6.6)         |
| Pre-existing ocular disease      | 4 (8.8)         |

Majority were Bacterial isolates (29 isolates,64.4%) followed by fungal (5 isolates,11.1%).

| Organism isolated | Number of isolates (%) |
|-------------------|------------------------|
| Bacteria          |                         |
| Staphylococcus aureus | 20 (68.9)              |
| Enterococcus spp. | 3 (10.3)               |
| Pseudomonas aeruginosa | 4 (13.7)              |
| Acinetobacter baumanii | 2 (6.8)               |

Predominant isolate was *Staphylococcus aureus* (68.9%) followed by *Pseudomonas aeruginosa*. (13.7%).

| Fungus isolated | Number (%) |
|-----------------|------------|
| Fonsacea pedrosi | 1 (20)    |
| Fusarium        | 2 (40)     |
| Aspergillus fumigatus | 1 (20)    |
| Candida albicans | 1(20)     |

Majority of the isolates were filamentous fungi (80%).

| Bacterial isolate | Staphylococcus aureus | Enterococcus spp. |
|-------------------|-----------------------|-------------------|
| Linezolid         | 20/20 (100%)          | 3/3 (100%)        |
| Vancomycin (30 µg) | 20/20 (100%)          | 3/3 (100%)        |
| Ciprofloxacin (5 µg) | 11/20 (55%)          | 2/3 (66%)         |
| Cefoxitin (30 µg)  | 10/20 (50%)           |                  |
| Gentamycin (10µg)  | 13/20 (65%)           | 1/3 (33%)         |
| Moxifloxin (5 µg)  | 14/20 (70%)           | 2/3 (66%)         |

All the gram- positive isolates showed 100% sensitivity to Linezolid and Vancomycin. Out of 20 isolates of *Staphylococcus aureus* 14 isolates were sensitive to Moxifloxin (70%) followed by Gentamycin (13 isolates,65%),Ciprofloxacin(11 isolates,55%).

| Bacterial isolate                  | Acinetobacter baumanii | Pseudomonas aeruginosa |
|------------------------------------|------------------------|------------------------|
| Ciprofloxacin (5 mcg)              | 1/2 (50%)              | 1/4 (25%)              |
| Gentamycin (10 mcg)                | 2/2 (100%)             | 2/4 (50%)              |
| Piperacillin tazobactam (100/10 mcg) | -                      | 3/4 (75%)              |
| Levofloxacin (5 mcg)               | 2/2 (100%)             | 1/4 (25%)              |
| Moxifloxin (5 mcg)                 | 1/2 (50%)              | 3/4 (75%)              |
| Tobramycin (10 mcg)                | 1/2 (50%)              | 2/4 (50%)              |

Table 1: Age group of the patients (n=45)

Table 2: Clinical features

Table 3: Risk factors (n=45)

Table 4: Types of isolate (n=45)

Table 5: Bacterial isolates (n=29)

Table 6: Fungal isolates (n=5)

Table 7: Sensitivity Pattern of Gram-positive cocci

Table 8: Sensitivity pattern of Gram-negative bacilli
The incidence of gram-positive cocci (79%) coincides with the study done by Tewari et al [18]. Predominance of Staphylococcus aureus was seen which is similar to a study done from Gangetic West Bengal [19]. However, Streptococcus pneumoniae was the predominant species in the study done by Bharathi et al. [20].

P. aeruginosa is the predominant gram-negative bacteria that causes Corneal ulceration. In our study P. aeruginosa accounted for 13.7% of bacterial isolates which matches with the results of Kaliamurthy et al [21] (9.7%). but G. Singh et al [22], Asbell PA et al. [23], Huang E et al [24] isolated higher number of Pseudomonas aeruginosa isolates which may be due to climatic conditions difference.

Fungal growth was seen in 11% of total corneal ulcers. Filamentous fungi are the major fungal pathogens in corneal ulcer in our study. Yeast like fungi have low predominance in fungal corneal ulcers. Fusarium species was the predominant fungal isolate in our study similar to the study done by Sirisha et al [17]. However, Laspina et al [25] found that Acremonium species was the most commonly identified fungi (40%) followed by Fusarium species (15%) which can be attributed to difference in geographic location and environmental factors between India and Paraguay.

Both gram-positive and gram-negative isolates showed tried susceptibilities to selected antibiotics. Antibiotic resistance among ocular pathogens is increasing in parallel with the increase seen among systemic pathogens and likewise may have serious consequences such as development of sight-threatening complications of keratitis, endophthalmitis, orbital cellulitis, or panophthalmitis [23]. Our antibiotic sensitivity results were quite comparable to studies done by Sharma et al [26], where the most common effective drug was Ciprofloxacin (75%) followed by Gentamicin. In the present series, only 70% of organisms Staphylococcus aureus were susceptible to moxifloxacin, the 4th generation fluoroquinolone. Researchers have documented significantly increasing resistance rates to moxifloxacin among Staphylococcus aureus. Thirteen (56.5%) of staphylococcal isolates were MRSA. Majority of isolates of P. aeruginosa were sensitive to Moxifloxacin (75%) which is similar with the reports of Kaliamurthy J. et al [27].

Finding of low resistance levels to these newer fluoroquinolones highlights the need to use them for first line monotherapy in BK. However, Moss et al [28] reported 100% sensitivity of moxifloxacin and Gatifloxacin against both gram-positive and gram-negative bacteria.

CONCLUSION

Understanding the geographical pattern of the pathogenic organisms responsible and the identification of risk factors, helps to create a broad strategy for the diagnosis and management of corneal ulcers and helps in guiding ophthalmologists to select appropriate antibiotic for empirical therapy. Confirmation by microbiological diagnosis is very essential in order to limit the ocular morbidity and prevent complications.

Conflict of interest : Nil
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