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MICROBIAL KERATITIS: PROFILE OF PATHOGENS ISOLATED IN A TERTIARY CARE HOSPITAL IN COASTAL KARNATAKA

Ophthalmology

Dr Raksha K* — Junior Consultant & Infection Control Officer, St. Martha's Hospital, No.5, Opposite Reserve Bank of India, Nrupthunga Road, Bangalore-560001*Corresponding Author

Shrikala Baliga — Professor, Department of Microbiology, Kasturba Medical College, Manipal University, Mangalore- 575001

Suchitra Shenoy — Associate Professor, Department of Microbiology, Kasturba Medical College, Manipal University, Mangalore- 575001

ABSTRACT

Introduction: Microbial keratitis is an important cause of visual disability and blindness caused by a variety of microorganisms.
Objectives: To identify the pathogens associated and the risk factors for microbial keratitis in our region.
Materials and Methods: 106 patients with suspected microbial keratitis during January 2012- January 2013 were examined by slit lamp microscopy and corneal scrapings were evaluated in our laboratory. Growth on the media was identified by standard procedures and all bacterial isolates were tested for susceptibility to antibiotics based on standard guidelines where appropriate
Results: 68.86 % of the samples were from males and 31.14 % from females. 50 % of them belonged to the age group of 15-40 years. 45.28% had ocular trauma. 63.20 % of patients were taking topical medications before undergoing a laboratory investigation. 18.86 % of samples yielded growth on culture. The pathogen profile (n=25) was Fusarium spp (7), Aspergillus spp (6), Curvularia spp (1), unidentified septate fungi (4), Microsporidia (5), Staphylococus aureus (1) and Streptococcus pneumoniae (1)
Conclusion: A higher incidence of fungal keratitis was seen during our study period. Ocular injuries, exposure to dust and vegetative matter, diabetes mellitus were important risk factors. High usage of topical medications before laboratory evaluation is a possible cause which hinders isolation and identification of the pathogen. Microbiological investigations are but necessary for rapid presumptive diagnosis and to guide in the initiation of correct treatment.

KEYWORDS

microbial keratitis, ocular pathogens, cornea, blindness, ocular microbiology

INTRODUCTION:

Microbial keratitis is an important cause of visual disability in India and is caused by a wide variety of infectious organisms. According to the World Health Organisation about 1.5–2.0 million new cases of monocular blindness in developing countries are due to corneal ulceration every year.[1] The diagnosis and treatment of this preventable cause of blindness poses a great challenge to both the laboratory personnel and the clinicians. In our retrospective cohort study we aimed to identify the specific pathogenic organisms responsible for and to assess the risk factors predisposing microbial keratitis in patients who came with signs and symptoms and were treated for the same in our hospital.

MATERIALS AND METHODS:

From a total of 106 patients with suspected microbial keratitis detailed clinical history regarding age, occupation, contact lens wear, eye injury, use of topical medications, diabetes mellitus and other immunocompromised states was obtained and slit lamp examination was carried out in the ophthalmology department between the period of January 2012 to January 2013. Corneal scrapings were taken under topical anaesthesia using a sterile No. 15 Bard Parker blade from the edge and the base of the ulcer under all aseptic precautions and sent immediately to the laboratory. The material was observed under 10 % KOH mount and Gram stain. The material was also inoculated on site on to chocolate agar medium, blood agar medium, Saboraud's dextrose agar (SDA) medium immediately and incubated under appropriate atmospheric conditions. Cultures on blood agar and chocolate agar were evaluated at 24 hours and at 48 hours and then discarded if there was no growth. Fungal cultures were inoculated onto SDA and incubated at 25˚C, observed for growth daily up to 7 days, and thereafter every week up to four weeks. Growth was considered significant if the same isolate was seen in more than one medium at the site of inoculation, and/or if growth was consistent with direct microscopy findings and/or the same organism was grown on repeated scraping. The growth on the media was identified by standard operating protocol using Gram stain, lacto phenol cotton blue mount, slide culture, modified Kinyoun's stain where appropriate.[10] All bacterial isolates were tested for susceptibility to gentamycin (10 µg), erythromycin (10µg), tobramycin (10µg), chloramphenicol (30 µg) and ciprofloxacin (5 µg) based on our antibiotic panel and standard guidelines.[14]

RESULTS:

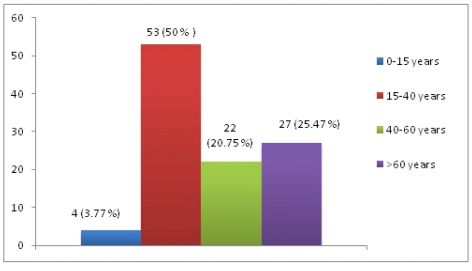

Figure 1: Age distribution of patients with suspected keratitis, n=106

Of the 106 samples of corneal scrapings received and processed in our laboratory, 68.86 % (73) were from males and 31.14 %(33) from females. 50 % of the patients belonged to the age group between 15-40 years (Figure 1).

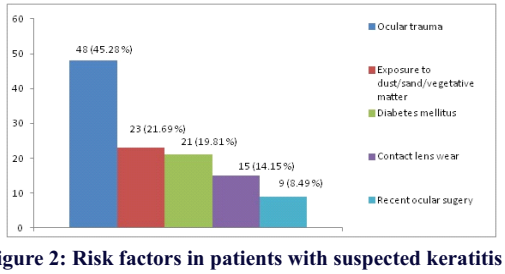

Figure 2: Risk factors in patients with suspected keratitis

Ocular trauma (45.28 %) was the predominant risk factor (Figure 2). Of these patients in whom pathogens were identified, 16 of them gave a history of trauma to the eye before developing symptoms, 6 of them were contact lens wearers and 9 of them were known case of diabetes mellitus. 63.20 % (67/106) of the patients were taking topical medications like ciprofloxacin, gentamycin, natamycin, steroids and/or other alternative forms of treatment before seeking medical help (Figure 3). 16.98 % (20/106) of the samples yielded growth on

culture.

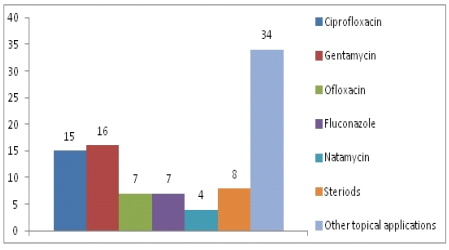

Figure 3: Topical medications used by patients with suspected keratitis prior to laboratory evaluation

When we correlated the culture with the microscopy findings of the 86 samples which showed no growth on culture, they had microscopy findings of polymorphonuclear cells suggestive of an inflammatory response (Figure 4).

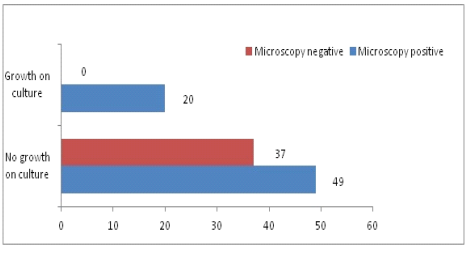

Figure 4: Inflammatory response as seen by microscopy in both culture positive and culture negative samples

Fungal isolates were predominate with Fusarium spp (7) followed by Aspergillus spp (6). Microsporidia spp contributed to 5 of the 25 pathogens which were identified under Gram stain, haematoxylin and eosin stain, and modified Kinyoun's stain. One isolate of Staphylococcus aureus and Streptococcus pneumoniae each was obtained which were susceptible to all the antibiotics tested in our panel. 4 of the fungal isolates showed septate fungal hyphae but could not be identified by conventional culture methods.

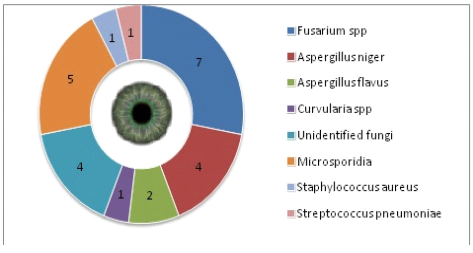

Figure 5: Pathogen profile from corneal scrapings of patients with suspected keratitis, n=25

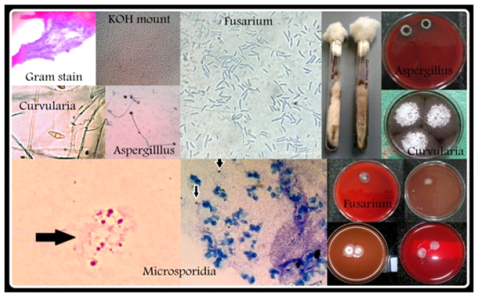

Figure 6: Pathogens identified by microscopy and culture in our laboratory from patients with suspected keratitis

DISCUSSION:

The clinical presentation of microbial keratitis is known to vary with the geographical area. It is influenced by the local climate and occupational factors as well. A higher incidence of fungal pathogens as a cause of keratitis in our region is related to the tropical climate as seen in previous studies done in South India. [3-6] In our study patients in the age group of 15-40 years were more commonly affected and males more commonly than females. Ocular trauma (p value <0.001) was a significant risk factor along with exposure to dust, sand or vegetative matter, diabetes mellitus, contact lens wear for the development of microbial keratitis. The lower isolation rate of some pathogens especially bacteria can be attributed to the widespread usage of over the counter topical medications before undergoing ophthalmic evaluation and laboratory investigations by most of these patients. Pseudomonas spp, coagulase negative Staphylococci, other Streptococcus spp as seen in other studies were not seen during our study period. However fungal isolates were more common. Fusarium and Aspergillus spp are more commonly implicated in our region. Also Microsporidia is an important emerging protozoal pathogen and should be suspected in cases of culture-negative keratitis. 7 In our study all the 5 cases were reported during early monsoon, this seasonal trend remains similar to the other studies in our region. [8] Ocular trauma being a significant risk factor in all the five cases. The limitation of our study was no work up for parasitic causes like Acanthamoeba spp mainly because there was no clinical suspicion.

In the background of a wide etiological spectrum; microbiological investigations, especially culture are much needed adjuncts but require time and expense in the diagnosis of keratitis. <4 % of cases require change in initial treatment after the microbiology report but however etiology in certain cases is important for prompt and right treatment. [12] We conclude that in the current scenario of ocular microbiology, along with culture, microscopic examination and Gram stain do provide us a rapid presumptive diagnosis, guide us in the initiation of immediate empirical therapy and help us in planning strategies for further management. A simple KOH mount or Gram stain could be sight saving.

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