International Journal of Medical Research & Health Sciences

www.ijmrhs.com Volume 2 Issue 1 Jan-Mar 2013 Coden: IJMRHS Copyright @2013 ISSN: 2319-5886

Received:2nd Dec 2012 Revised:20th Dec 2012 Accepted: 22nd Dec 2012

Original research article

CLINICAL STUDY OF CAUSATIVE MICROBIAL AGENTS OF SUPPURATIVE KERATITIS CASES IN RURAL AREA

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ABSTRACT

The epidemiological pattern and causative agents for suppurative corneal ulcer vary significantly from region to region so it is important to determine the regional etiology for diagnosis and management. A prospective study was conducted to find out the specific microbial agents responsible for suppurative keratitis. 62 patients of keratitis were included in the study. Male patients (58.06%) above 40 years (69.35%), farmers (61.29%) by occupation were commonly involved. The commonest ulcer was fungal (35.48%) &the causative microorganism found on culture was *Aspergillus* (48.48%). In bacterial ulcer, *Staphylococcus aureus* (38.70%) &*Pseudomonas* (19.35%) were isolated as the responsible microbial agents.

Keywords: Corneal ulcer, Fungal keratitis

INTRODUCTION

The cornea is the first and most powerful refracting surface of the optical system of the eye. The normal healthy cornea is avascular and devoid of lymphatic channels. [1]Corneal cells derive its nourishment by diffusion from the aqueous,the capillaries at the limbus and oxygen dissolved in the tear film. The cornea is the most densely innervated tissue in the body. The sensory supply is via the fifth division of the trigeminal nerve. Corneal ulcer is defined as a loss of corneal epithelium with underlying stromal infiltration and suppuration associated with signs of inflammation with or without hypopyon. [2] Microbial keratitis in a previously normal eye is suspected by the onset of pain and the presence of ulceration, mucopurulent.Exudates adherent to the ulcer surface, focal stromal suppuration,diffuse cellular infiltration in the adjacent stroma and iritis.[3] The epidemiological pattern and causative agent for suppurative corneal ulcer varies significantly from country to country and even from region to region within the same country.It is important to determine the “regional” etiology within the given region for a comprehensive strategy for the diagnosis and proper treatment of the corneal ulcer.

Several studies have addressed these questions in the Indian subcontinent. [4,5]

MATERIALS AND METHODS

A prospective study was carried out for the period of two years at Department of Ophthalmology, Pravara Rural Hospital. The study was approved by the ethical committee of the Institute. Patients presenting to the eye OPD with complaints of ocular trauma by vegetative matter, pain, redness, were evaluated for keratitis. 62 patients found to have suppurative keratitis were included in this study. Patients were included on the basis of detailed ocular (torch light and slit lamp) and systemic examination. Informed consent was taken.

Examination of the smear

Scraping of ulcer margin was done by 15 no. blade under topical anesthesia. The smear was fixed with Gram stain and KOH wet preparation. The scraping was done before starting any treatment. Smears were made from the scraping of ulcer margin using Bard-Parker blade no.15 and sent for KOH wet preparation and Gram stain. For culture, scrapped material was inoculated into blood agar and Sabouraud dextrose agar (SDA).

The corneal scraping sample was transported to a microbiological laboratory in sterile nutritious broth and inoculated in blood agar, incubated at 37°C for 24 hrs. Colonies obtained were described by their colony characteristics and growth sensitivity was done.

For fungal cultures, the materials were inoculated onto Sabouraud's dextrose agar (SDA) and incubated at room temperature, examined daily, and discarded after 2 weeks if there was no growth.

RESULTS

The age distribution of corneal ulcers varied from 8 years to 85 years in the study.Fungal keratitis was the most commonly seen in 22 patients out of 62 accounting for 35.48%,followed by bacterial keratitis in 32.25% case and mixed keratitis in 17.74%.Commonest fungal organism isolated in our study was *Aspergillus* accounting for 48.48%, followed by *Fusarium*at 30.30% and *Candida* in 21.21% of the patients. As for bacterial keratitis, the microorganisms isolated shown that *Staphylococcus aureus* was found to be the commonest among Gram positive organisms accounting for 38.70%, followed by *Streptococcus pneumonia* (25.80%), *Staphylococcus epidermidis* (6.45%) and *Diphtheroids* (3.22%). Among Gram negative organisms Pseudomonas species were found to be the commonest accounting for 19.35%, followed by *Enterobactor* and *Moraxella*species both accounting for 3.22%.

Table 1: Diagnosis of corneal ulcer based on smear examination

Ulcer type	Male	Female	Total	Percentage
Fungal	16	6	22	35.48%
Bacterial	7	13	20	32.25%
Mixed	8	3	11	17.74%
Sterile	5	4	9	14.53%
Total	36	26	62	100%

Table 2: Fungal organisms isolated on culture

Organism isolated	Male	Female	Total	Percentage
Aspergillus species	12	4	16	48.48%
Fusarium species	7	3	10	30.31%
Candida species	5	2	7	21.21%
Total	24	9	33	100%

Table:3. Bacterial organisms isolated on culture (gram positive)

Organism	Male	Female	Total	Percentage
Staphylococcus aureus	7	5	12	38.70%
Staphylococcus epidermidis	1	1	2	6.45%
Streptococcus pneumoniae	5	3	8	25.80%
Diphtheroid	-	1	1	3.22%

Table:4. Bacterial organism isolated on culture (gram negative)

Organism	Male	Female	Total	Percentage
Pseudomonas	2	4	6	19.35%
Enterobactor species	0	1	1	3.22%
Moraxella species	0	1	1	3.22%
Total	15	16	31	100%

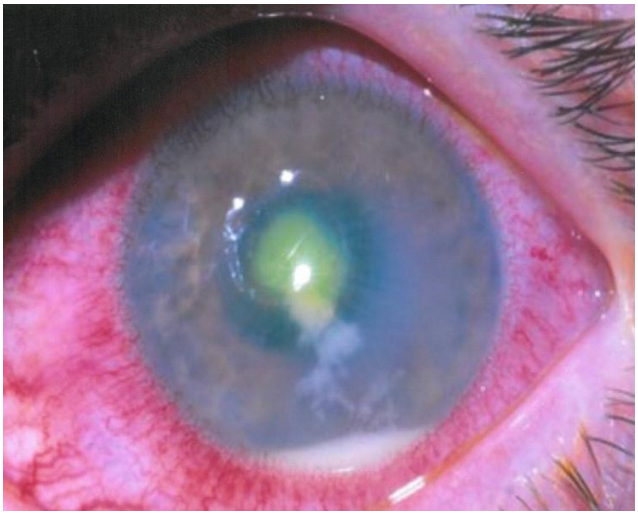

Fig:1. Central corneal ulcer with hypopyon

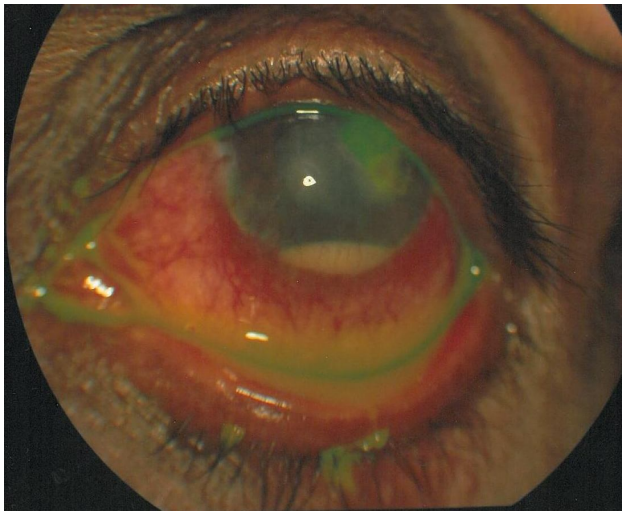

Fig:2. Corneal ulcer with flurescein stain

DISCUSSION

Special importance is given to corneal ulcer due to the fact that they leave behind a permanent opacity which interferes with visual acuity and if not attended to, may cause complications that may lead to the loss of an eye. [2]

Basak et al found pure fungal growth at 42.5% , pure bacterial growth in 15.3%, mixed growth in 9.5% cases.[6]Bharathi et al in their study of 3183 patients found fungal growth at 34.4%, bacterial growth at 32.77%, mixed growth in 2.39%.[5] Chowdhary et al and Singh et al study of 485 cases found fungal keratitis in 39%.[7]

Hertel et al in in their study of 50 cases, find that *Pneumococci* was present in 66% cases.[8] McNabb et al on 25 cases found *Pneumococci* 64%, *Staphylococci* 20%, *Streptococci* 4%, *Diplococcus* 4%.[9] Final outcome of the cases after full course of treatment shows that in 62.90 % of the cases with keratitis developed either nebular to macular grade of corneal opacity,followed by dense leucomatous opacity in 33.87% of the cases and corneal perforation was seen in only 3.22% of the patients.This data was supported by Saha et al in which 40.55% of the cases of keratitis healed with corneal scar formation after a full course of treatment.[10]

Scarring or perforation due to corneal ulcer is the major cause of corneal blindness throughout the

world. Among the surveys in India, corneal blindness is the third commonest cause of blindness. [4,5] A delicate balance exists between the cornea and its surrounding environment that helps the cornea maintain its integrity in spite of continuous exposure to foreign bodies and pathogens. Corneal ulceration may result when the balance is disrupted and the defense mechanisms are compromised. The associated ocular morbidity is the result of several factors and patient management is directly affected by the lack of diagnostic facilities and initiation of appropriate antimicrobial therapy. Specific treatment requires quick and accurate identity of the causative microorganism.

CONCLUSION

In view of several such dilemmas while dealing with microbial keratitis, carrying out simple microbiological investigations can make a substantial difference to the accuracy of management of corneal suppuration. Simple Gram stain, KOH mount, culture and antimicrobial sensitivity can make a big difference to the ultimate outcome of treatment.

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