

Fungal and bacterial isolates of corneal ulcers

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Abstract

Aim: To evaluate fungal and bacterial isolates of corneal ulcers.

Material and method: A hospital based prospective study was carried out on 100 patients presenting with corneal ulcers at Department of Ophthalmology at Dr S.N.Medical College, Jodhpur from January 2019 to May 2019. Clinically suspected cases of fungal and bacterial corneal ulcers were selected for study and after diagnosis of corneal ulcers, a standardized Performa was filled. In all patients scrapings from corneal ulcers were subjected to complete microbiological evaluation. This was diagnosed microbiologically in two ways i.e. Smear examination by light microscopy and Culture.

Results: 61% of patients are affected from bacterial infections, among them 95% patient has single strain & 5% has double strain. In 23% patient fungi is isolated. Fungal culture was positive in 83.3% patients. Fusarium sp (50%) is the most common fungi isolated, followed by Aspergillus sp (25%). Both are accounting nearly 75% of cases. Bacterial culture is positive in 88% of cases. The common bacterial isolates are Staphylococci Aureus (42%) and Staph Albus (28.5%), followed by Pseudomonas (13.6%).

Conclusion: The results of the study concluded that bacterial and fungal culture positive was 88% and 83.3% respectively.

Keywords: corneal blindness, fungal infection, microbial infections

Introduction

Corneal blindness is major problem in India. In developing countries corneal infection is second most common cause of blindness after un-operated cataract [1].

Microbial infections constitute the most common and serious ocular infection in developing world, caused by variety of bacteria, fungi, viruses and parasites. The severity of resultant infection depends upon virulence of invading organism, liberation of toxins, the integrity of host defense mechanism, resistance of host tissue, and age of the patient. Most of corneal ulcers results from trauma to epithelium [2, 3]. Therefore the present study was conducted to evaluate fungal and bacterial isolates of corneal ulcers.

Material and Methods

A hospital based prospective study was carried out on 100 patients presenting with corneal ulcers at Department of Ophthalmology at Dr S.N. Medical College, Jodhpur from January 2019 to May 2019.

Clinically suspected cases of fungal and bacterial corneal ulcers were selected for study and after diagnosis of corneal ulcers, a standardized Performa was filled. In all patients scrapings from corneal ulcers were subjected to complete microbiological evaluation. This was diagnosed microbiologically in two ways:

1. Smear examination by light microscopy

KOH preparation

Gram's stain and Giemsa stain preparation

2. Culture

Blood agar, Chocolate agar, Thioglycolate broth, Sabouraud's dextrose agar and Nutrient agar.

Jones criteria for diagnosis: It comprises of clinical signs of infection plus isolation of bacteria (10 or more colonies) on one solid medium and one additional medium, or isolation of fungi (any detectable growth) on any two media or one medium in presence of a positive smear.

Statistical analysis

Data so collected was entered in an excel sheet and analysed using SPSS software version 24.

Results

Table 1 shows that trauma to eye is most common factor (44%) for corneal ulcer followed by foreign body (27%).

61% of patients are affected from bacterial infections, among them 95% patient has single strain & 5% has double strain. In 23% patient fungi is isolated. No organism is isolated in 4% of the cases. 12% of cases were isolated for both bacteria and fungi (table 2).

Fungal culture was positive in 83.3% patients. Fusarium sp (50%) is the most common fungi isolated, followed by Aspergillus sp (25%). Both are accounting nearly 75% of cases. Bacterial culture is positive in 88% of cases. The common bacterial isolates are Staphylococci Aureus (42%) and Staph Albus (28.5%) followed by Pseudomonas (13.6%) as shown in table 3-5.

Table 1: Distribution of cases

Factor	No of cases	%age
Trauma	44	44
Foreign Body	27	27

Corneal Pathology	3	3
Dry eye	4	4
Post-Operative	2	2
Conjunctivitis	6	6
Metabolic Disorder DM	4	4
Unknown	11	11
Total	100	100

Table 2: Microbial profile among the study population

Microbial Profile	No of cases	%age
Bacterial	61	61
Fungi	23	23
Mixed	12	12
Sterile	4	4
Total	100	100

Table 3: Smear Examination for Gram Stain & Koh

Smear Examination	Organism	No of Cases	%age
Gram stain	Gram +ve Cocci in Pairs	45	38.44
	Gram +ve Bacilli	5	6.49
	No Bacteria	3	3.89
KOH Mount	Fungal Hyphae	20	25.97
	Yeast Bodies	4	5.14
Total		77	100

Table 4: Fungal Culture and Species Grown

Species Grown	No of Case	%age
Fusarium	10	50
Pencillinium	1	5
Aspergillus	5	25
Mucor	2	10
Curvularia	1	5
Candid	1	5
Total	20	100

Table 5: Bacterial Culture and Organism Grown

Organism Grown	No of Stains Isolated	%age
Staphylococcus Aureus	20	45.4
Staphylococcus Albus	13	29.5
Pseudomonas	6	13.6
E. Coli	0	0
N. Catarhalis	1	2
Gram Positive Bacilli	4	9
Total	44	100

Discussion

Pyogenic corneal ulcers have pleomorphic clinical picture. Early diagnosis & treatment can prevent the corneal blindness in majority of cases. Role of laboratory diagnosis is crucial in management of corneal ulcer. There are several studies concluding that the percentage of isolation and prevalence of species varies from place to place.

Trauma was most common predisposing factor of corneal ulcer. In present study 75% of patient is from rural area. Filamentous fungi were responsible for majority of corneal ulcer and Fusarium sp (43%) was most common fungal isolates.

Srinivasan M, *et al.* [4] reported that the incidence of mycotic keratitis in India varies from 30 to 40 % and Fusarium and Aspergillus species were responsible for 70% of all fungal corneal ulcers. Our study also shows the incidence of mycotic keratitis is 35% and Fusarium (50%) and Aspergillus (25%) are responsible for 75% of all corneal ulcers.

Sharma A (1994) [5] reported the incidence of fungal corneal ulcer 48%. Aspergillus sp was most common fungi accounting for 40% of all fungal isolation. Sha VM *et al.* [6] studied the pathogenesis of bacterial keratitis along with laboratory diagnosis. They show that Staphylococci are predominant cause of bacterial keratitis. In our study, Staphylococci Aureus is accounting for 45.4% of total bacterial keratitis cases, followed by Staphylococcus Albus 29.5%.

Summary and Conclusion

In this study, male: female ratio is 1.8:1 and the most commonly affected group is 60 years and above. Rural population is more commonly affected than the urban population (3:1). The minor ocular trauma (44%) is the most predisposing factor, followed by the corneal foreign body (27%), together accounting for 71% of all cases of corneal ulcer. People engaged in farming and agriculture in rural areas is the most commonly affected by microbial keratitis.

Bacterial and fungal culture positive was 88% and 83.3% respectively. The commonest bacterial isolates in culture are Staphylococci (Staph. Aureus 45.4% and Satph. Albus 29.5%) followed by Pseudomonas (13.6%) in bacterial culture. The most common species of fungus grown on culture is Fusarium (50%) followed by Aspergillus (25%) and these two species are responsible for 75% of cases of fungal corneal ulcers.

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