International Journal of Medical and Health Research
ISSN: 2454-9142
Received: 11-04-2019; Accepted: 14-05-2019
www.medicalsciencejournal.com
Volume 5; Issue 6; June 2019; Page No. 50-51

Occurrence of fungal keratitis among patients at SMS hospital Jaipur

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Abstract
Background: Fungal keratitis is an infectious disease caused by direct implantation of fungus in cornea by traumatic injury. Its delayed diagnosis causes complications which often lead to permanent loss of vision. Though it is reported worldwide, maximum occurrence is reported in tropical and subtropical area. It is one of the major causes of loss of vision in India. Objective of present is to assess occurrence of fungal keratitis in patients attending Ophthalmology department of SMS hospital, Jaipur.
Material and Method: The study was conducted from SEPTEMBER 2016 to AUGUST 2017 on 32 patients who presented with clinically suspected corneal ulcer to the Ophthalmology department of SMS Medical College Jaipur. Each patient was examined and corneal scrapings were collected by an ophthalmologist. Wet mount in 10% KOH was examined for fungal elements. The specimen was also inoculated on Sabouraud's Dextrose Agar (SDA) with and without antibiotics. Fungal growth was identified by the standard mycological techniques.
Result: Total 32 samples were tested. Total 15(46.87%) samples were sterile and 17(53.12%) samples were culture positive. Fusarium was the commonest isolate (52.94%), followed by Aspergillus flavus (17.64%), Aspergillus fumigatus (11.76%), Bipolaris(5%), Curvularia (5%), Fonsecaea (5%)
Conclusion: Filamentous fungi are most important cause of infection in case of corneal infection. Fusarium species was most common isolate among patients tested.

Keywords: Fungal keratitis, Fusarium, corneal ulcer

Introduction
Fungal Keratitis is a suppurative, ulcerative and sight threatening infection of eye that sometimes leads to loss of eye.[1] Delayed diagnosis of fungal keratitis causes complications which often lead to permanent loss of vision. Though it is reported worldwide, maximum occurrence is reported in tropical and subtropical area. Reported incidence of mycotic keratitis in worldwide is 17% to 36% and in India is 44% to 47%.[2]

The rate of incidence of fungal Keratitis has been increased over the last few years. Trauma is the major predisposing factor.[3, 4] Objective of this study is to find out the incidence and most common species of the fungal organism isolated from corneal ulcer patients.

This study highlights the importance of looking for fungi in eye infection as appropriate use of antifungal drugs could result in saving the eyesight of patient.

Material and method
The study was conducted from SEPTEMBER 2016 to AUGUST 2017 on 32 patients who presented with clinically suspected corneal ulcer to the Ophthalmology department of SMS Medical College, Jaipur. Each patient was examined and corneal scrapings were collected by an ophthalmologist and sent to microbiology laboratory of S.M.S hospital. Specimens of the patients were examined by direct microscopy by 10% KOH wet mount and Gram stain for demonstration of fungal elements.

The Specimen was inoculated on Sabourand's Dextrose agar (SDA) with antibiotics and without antibiotics. One set (i.e. with and without antibiotic) of the medium was incubated at 37 Celsius and the other set at room temperature (i.e. 25 Celsius). The cultures were examined for growth daily for first week and twice a week for the subsequent period of about three weeks. The cultures were retained for at least four weeks and then discarded as sterile if there was no growth and

The growth rate; texture, morphology of colony and pigment on obverse and reverse side on SDA were noted for the fungal identification. Lactophenol Cotton blue (LPCB) preparation was done.

Result and Discussion
This study included 32 cases of corneal ulcers, based on clinical findings, out of which 17(53.12%) cases were diagnosed with mycotic keratitis and 15(46.87%) were found sterile in the laboratory. All age groups and both the sex were included in this study. The incidence rate of fungal keratitis was more in males (65.62%) than in females (34.37%). The incidence of corneal ulcer was maximum in the age group 41-50 years (41%) followed by 31-40 years (32%) and above 60 years (27%). [Table:1]

Table 1: Age and Sex wise distribution of cases.

s.no			
1.	**Age**	**No. of cases**	**Percentage (%)**
	20-30	0	0
	31-40	10	31.25
	41-50	13	40.62
	More than 60	9	28.12
2.	sex		
	Male	21	65.62
	Female	11	34.37

Table 2: Showing Fungal pathogen isolated in cases of keratitis

Fungal isolates	No. of cases	Percentage (%)
Fusarium	9	52.94
Aspergillus flavus	3	17.64
Aspergillus fumigates	2	11.76
Bipolaris	1	5
Curvularia	1	5
Fonsecaea	1	5

Among the various fungal isolates Fusarium was the commonest isolate (52.94%), followed by Aspergillus flavus (17.64%), Aspergillus fumigatus (11.76%), Bipolaris (5%), Curvularia (5%), Fonsecaea (5%) [Table: 2]. Fusarium is a filamentous fungi, part of a group often referred to as hyphomycetes, widely distributed in soil and associated with plants. Most species are harmless saprobes.[5] In Sawai Man Singh (SMS) hospital, Jaipur, receives patients not only come from Jaipur but from all over Rajasthan. Majority of patient belongs to rural background and they are associated directly or indirectly to agricultural field therefore there is possibility to get injured with plants easily. It increases chances to get positive fungal culture in corneal ulcer scraping sent by ophthalmologist in microbiology laboratory procedure.

Table 3A: Percentage of fungi isolated from various studies

S. No	Studies	Fusarium	Aspergillus spp.
1.	Saha *et al.* 2006 [6]	7.79	48.04
2.	A K leck *et al.* 2002 [7]	39.9	20.9
3.	M Srinivasan *et al.* 1997 [8]	47.1	16.1
4.	Palanisamy *et al.* 2019 [5]	52.5	14.2
5.	M Jayahar *et al.* 2003 [3]	42.82	26

Table 3B: Percentage of fungi isolated from various studies

s.no	Studies	bipolaris	curvularia	Funsecaea
1.	Saha *et al.* 2006 [6]	0	0	0
2.	A K leck *et al.* 2002 [7]	0.6	9.6	0
3.	M Srinivasan *et al.* 1997 [8]	0.7	3.2	0
4.	Palanisamy *et al.* 2019 [5]	5.3	2.9	0
5.	M Jayahar *et al.* 2003 [3]	2.36	2.64	0

According to table no. 3A and table 3B, out of complete fungal isolates, fusarium fungi were in maximum proportion of fungal isolates followed by aspergillus species. Palanisamy *et al.*[5] 2019(52.5%) study and M Srinivasan *et al.*[8] 1997 study (47.1%) result was almost same for fusarium fungal isolate in culture in present study and In R.R khorgade *et al.*[1] 2015 study, Saha *et al.* 2006[6] study and Dutta LC *et al.*[9] 1981 study found aspergillus species most common in corneal ulcer scraping.

Conclusion

Filamentous fungi are most important cause of infection in case of corneal infection. Fusarium species was most common isolate among patients tested and direct microscopic examination with potassium hydroxide wet mounts proves to be a rapid, simple, inexpensive diagnostic means.

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