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Prevalence of Fungal Corneal Ulcers in a Tertiary Eye Care Centre

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Abstract:

Fungal corneal ulcer is common in India due to the tropical climate and a large agrarian population that is at risk. Various factors such as trauma, the injudicious use of topical antibiotics and corticosteroids are involved. Many of age and sex – related risk factors also play a minor role. This 15 months study from visakhapatnam revealed that that fungi were detected in 78 (11.14%) out of 700 patients investigated In O.P.

Direct microscopy was positive in 80 (11.42%) and culture in 78(7.3%) patients. Aspergillus spp.were the most common causative agents accounting for 28(35.89%) of the isolates, followed by fusarium spp with 22(28.20%) curvullaria sp.With 14 (17.94%), penicillium sp.with 4(5.10%),alternaria sp 4(5.10%) Acremonium sp.4 (5.10%),cladosporium with 2(2.55%) Isolates. The prevalence of fungal ulcers in males was three times higher than in females. The affected individuals had a rural background and were in the 51-60 year age group.

1. Introduction

Fungal corneal ulcer is an infection caused by the penetration of fungi into the corneal stroma. It is a frequent cause of visual disability in developing countries[1]. This applies even more to regions where Trachoma and other infectious etiologies of ocular diseases are more prevalent and hence corneal opacification is the second major cause of blindness after cataract [2]. Most often the ulcer develops subsequent to corneal trauma caused by vegetative or soil particles [3]. Fungal corneal ulcer is a rare event [4] in patients undergoing surgery such as keratoplasty and this applies also to contact lens wearers [5]. Injudicious use of topical corticosteroids and antibacterial agents for external ocular diseases, enhances the risk of fungal corneal ulcer [6]. More than 60 species of fungi have been described as causative agents [7]. However, the frequency and profile of these fungi differ in various population groups, largely due to environmental, geographical and economic factors.

Mycotic keratitis is difficult to manage. Increasing awareness of fungal diseases and the availability of various newer techniques for fungal isolation have contributed to the early establishment of the diagnosis of the disease [8-10]. The present study was carried out to assess the prevalence of specific fungal pathogens and to analyze the influence of demographic factors on the spectrum of fungal species responsible for fungal corneal ulcer in northern India.

2. Patients and Methods

A total of 80 patients with corneal ulcers at the Department of Ophthalmology from 1 January 2014 to 31 March 2015 were investigated for fungal etiology in the department of Medical Microbiology & Regional eye institute Andhra medical college Visakhapatnam. Patients with evidence of bacterial herpes simplex and Acanthamoeba keratitis were excluded from this study. The clinical diagnosis of mycotic keratitis was established on the basis of a history of ocular trauma with vegetable matter and the finding of a dry-raised infiltrate with hyphate margins and a thick hypopyon.

Corneal scrapings were taken aseptically from the base and margin of the ulcers using 15 bard parker blade under local anaesthetic (4% xylocaine) drops. Direct microscopy was carried out with 10% koh wet mount and gram stain for demonstration of hyphae. The corneal scrapings were cultured for fungal agents, sabourauds dextrose agar were inoculated and incubated at 28degree *C over a period of 4weeks. All the cultures were checked daily during the first week and twice a week during next 3 weeks. The fungal isolates were identified by their colony characteristics and microscopic appearance in the lactophenol cotton blue stained mount also by slide cultures.

Various fungi that cause corneal ulcers

Genera/Species of fungi	No	%
Genus Aspergillus	(28)	(35.89%)
Aspergillus fumigates	9	(11.53%)
Aspergillus flavus	9	(11.53%)
Aspergillus glaucus	4	(5.10%)

Aspergillus niger	4	(5.10%)
Other Aspergillus sp.	2	(2.55%)
Fusarium sp.	22	(28.20%)
Curvularia sp	14	(17.94%)
Acremonium sp.	4	(5.10%)
Pencillium sp.	4	(5.10%)
Alternaria sp.	4	(5.10%)
Cladospora sp.	2	(2.55%)

Demographic details of the patients like a brief clinical history regarding the use of antibiotics or corticosteroids, duration of the ailment, trauma to the eye and occupation were recorded. Patients were treated with topical natamycin 5% suspension every hour and atropine 1% thrice daily. Those with deep stromal involvement and hypopyon received oral Ketokonazole 200 mg twice daily in addition to topical therapy.

3. Results

Among the 700 patients with corneal ulcers were detected in 80 (11.42%) were positive for fungus by direct microscopy and/or repeated isolation of the same fungi on culture. On direct microscopy alone 80, (11.42%) scrapings showed septate hyphae, pseudohyphae or yeast cells, and in 78 (11.14%) cases fungi were isolated by culture. Two cases revealed sterile cultures in spite of positive direct microscopic findings. The spectrum of fungi isolated showed that *Aspergillus* spp. were isolated from the majority of the patients with twenty eight (35.89%) of the 80 cases. The order of frequency of the other fungi isolates was; *Fusarium* sp. twenty two (28.20%), *Curvularia* sp. fourteen (17.94%), *Acremonium* sp. four (5.10%) *Penicillium* sp. four (5.10%), *Alternaria* sp. four (5.10%), *cladosporium* two (2.55%)

(Table 1). Out of the four species of the genus *Aspergillus* the following were isolated. *Aspergillus fumigatus* nine (11.53%), *Aspergillus flavus* nine (11.53%), *Aspergillus glaucus* four (5.10%), *Aspergillus niger* four (5.10%); two isolates of the genus *Aspergillus* (2.55%) could not be identified. Four patients showed two isolates each. Males were more commonly affected than females, the M:F ratio was 3:1. The age group 51-60 Years was most commonly involved.

4. Discussion

The Regional eye institute Andhra medical college Visakhapatnam, is a tertiary care centre to which the Patients are referred from neighbouring districts of Visakhapatnam Andhra Pradesh. Most of the rural agrarian population of the region is at risk of developing fungal corneal ulcer due to exposure to the environment and corneal trauma while working in the fields. The patients in this area usually seek medical advice at a later stage because of ignorance and illiteracy. In addition, the tropical climate with high humidity and temperatures in these states greatly favours fungal infections.

In the present study, *Aspergillus* spp, accounted for 35.89% of total isolates with variable prevalence rates from 50% in Hyderabad, 64% in Madras and 70% in Amritsar [11,12]. Venugopal et al have reported *A. Flavus* to be the most common agent followed by *A Niger* and *A Fumigatus*. In this study *A Flavus* and *A Fumigatus* were isolated more often than other species of *Aspergillus*. *Fusarium* has been reported as a common fungus in studies from south India [12, 13]. In our study the prevalence of *Fusarium* spp, was higher than in previous reports from this region, particularly by Talwar et. al. where no *Fusarium* spp, was isolated [12,14]. *Curvularia* were isolated.

In the present study of 80 cases of corneal ulcers investigated, fungal pathogens were isolated in 78 (7.3%) cases. Reddy et al [15] reported a prevalence of 6%; Puttanna et al [16] of 11.3% and Sharma et. al. [17] of 19%. High prevalence rates have been reported by Venugopal et. al. (46.3%), Subbannayya et al (22.7%) and Dasgupta et. al. (28.6%) [12,18,19]. The low prevalence in the present study may be due to the fact that all patients with microbial keratitis were investigated for possible fungal etiology. Among the 80 cases direct microscopical findings correlated with repeated culture isolation in 78 (11.14%). In 2 cases direct microscopy was positive, but cultures were negative. Similar observations have been reported by Singh et al [20]. As reported by other investigators fungal corneal ulcers were more prevalent in men than in women. This may be due to greater exposure of males during outdoor activities compared to females. Venugopal et al [12] reported that men were affected twice as often as women.

5. References

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