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Original Research Article

MICROBIAL PROFILE AND ETIOLOGICAL DIAGNOSIS OF KERATITIS IN A TERTIARY CARE HOSPITAL: CROSS SECTIONAL STUDY.

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Abstract

Background: Blindness is a major public health problem worldwide, and infectious keratitis is one of the predominant causes. Ulcerative keratitis due to infection with a wide range of organisms such as viruses, bacteria, fungi or protozoa has been reported. Bacterial and mycological keratitis typically occurs in persons having some associated factors.

Materials & Methods: This cross sectional study was conducted at the Vedantaa Institute of Medical Sciences, Palghar between February 2021 to April 2021 were involving 72 eyes of 72 patients with corneal ulcer were studied during the study period. Swabs and scrapping from the corneal ulcer were collected aseptically. Staining and culture were performed as per standard guidelines. Bacterial and fungal species were isolated as per standard microbiological guidelines and data were analysed.

Results: Male to female ratio of study cases was 1.57:1. The main occupations of study cases were farming (30 i.e. 41.7%) and construction work (13 i.e.18.1%). Out of 72 samples, in 29 (40.3%) samples fungal species were isolated and in 43 (59.7%) samples bacteria were isolated. Among 29 fungus isolates, 16 (22.2%) were A. flavus and 11 (15.3%) were A. niger. Among 43 bacterial isolates 13 (18.1%) were Pseudomonas species, 18 (25.0%) were Staphylococcus aureus and 11 (15.3%) were Coagulase negative staphylococci.

Conclusion: Infective corneal ulcers mainly affected working males involved in farming. Gram stain and KOH mount analysis showed fungal etiology more frequently than bacterial.

Keywords: Infective Keratitis, Etiology, Microbial, Fungal, Bacteria.

Introduction:

In the developing countries infectious keratitis is a leading cause of corneal blindness (1). Corneal ulceration results in 1.5–2 million new cases of corneal blindness annually, posing a major public health problem according to the World Health Organization (WHO) reports (2). The incidence of this condition varies from 11 per 100,000 in the United States to 1 - 299 per 100,000 in developing countries. Keratitis blunts the quality of life. Many patients are young, working adults who develop an unexpected infection from contact lenses or other injury (3). Fungi are the most common etiological agents which account for 30–40% whereas bacteria account for 13–48% of all cases of suppurative keratitis; this varies by geographical area (4). In india, about 6.8 million are blind because of corneal disease (5). Majority patients of infectious keratitis present as a corneal ulcer with complaints of redness, pain, watering, photophobia, and diminution of vision. These cases pose a challenge to treating ophthalmologist as far as diagnosis and management are concerned. Thus optimal treatment in time can reduce serious complications like corneal perforation, endophthalmitis, or even panophthalmitis (6). This present study was conducted to know the ethology and microbiological pattern of infective corneal ulcers in patients presented to this institute.

Materials & Methods:

This cross sectional study was conducted on department of Ophthalmology, Vedantaa institute of Medical Sciences, Palghar between February 2021 to April 2021. This study was approved by Institutional ethical committee. In this study involved 72 patients were purposively selected during study period. All the patients were included with infective corneal ulcers above 18 years of age. Swabs and scrapping of corneal ulcer were taken aseptically and were sent to microbiology laboratory immediately.

Data were collected which includes etiological and microbiological findings of corneal scrapping etc. The history included symptoms of redness, pain, photophobia, watering, history of (h/o) trauma, contact lens use, prolonged use of any eye drops, h/o use of herbal medications, h/o swimming in the pool and h/o diabetes mellitus, Rheumatoid arthritis, etc. KOH mount and Gram stain were performed. All specimens were inoculated on Blood agar, Mac Conkey agar and Sabouraud dextrose agar. Isolation and identification of bacterial and fungal spp. were done as per standard guidelines (7,8).

Statistical analysis:

The data was arranged in an MS Excel sheet and statistical analysis was done. The number and percentage of patients according to age groups, gender and occupations were

calculated. Also, the percentage of patients with different clinical features of corneal ulcer and microbiological etiology was calculated.

Results:

72 eyes of 72 patients with infective corneal ulcers were include in this study. Among these 44 were male and 28 were female. Out of 72 patients 35 were more than 45 years old, 24 were between 25 to 45 years and 13 were below 25 years. Majority 52 of the patient were rural & 30 patients were farmer. (Table No. 1)

Table 1: Socio Demographic distribution of the study subjects.

Variables		Frequency	Percentage
Age Group	18 - 25 years	13	18.1%
	25 - 45 years	24	33.3%
	More than 45 years	35	48.6%
Gender	Male	44	61.1%
	Female	28	38.9%
Resident	Rural	52	72.2%
	Urban	20	27.8%
Occupation	Farmer	30	41.7%
	Construction Worker	13	18.1%
	Factory Worker	4	5.5%
	Other	25	34.7%

Table 2: Distribution according to the Microbiological profile on Gram stain and KOH amount.

Microbial Profile	No. Of Patients	Percent
Only Bacteria	32	44.4%
Only Fungi	36	50.0%
Mixed	4	5.6%

In the above table shows that microbial etiology was bacterial in 32 (44.4%) and fungal in 36 (50.0%) cases, four cases showed mixed growth both bacterial and fungal (5.6%).

Table 3: Distribution of the patients according to the Etiological Profile.

Etiology Organism	No. Of Patients	Percent
Staphylococcus aureus	18	25.0%
CONS*	11	15.3%
Pseudomonas	13	18.1%
E. Coli	1	1.4%
A. Flavus	16	22.2%
A. Niger	11	15.3%
Candida	2	2.8%

The most common bacterial isolates were Staphylococcus aureus 18 (25.0%), followed by Pseudonomas 13 (18.1%) & CONS 11 (15.3%). Also the most common fungi isolates were A. Flavus 16 (22.2%) followed by A. Niger 11 (15.3%) & Candida 2 (2.8%).

Discussion:

Infective Keratitis is a potentially damaging ocular infection when the corneal epithelial barrier is breached owing to injury or trauma. Immediate diagnosis and treatment are required if vision threating outcomes are to be avoided (9). In this study explored etiological agents associated with Infective Keratitis and Microbial profile with infective keratitis.

In the study, more than 45 years was the age group in which most of the keratitis cases were recorded. This is in contrast to the findings of an epidemiological study from North India which states 31–40 years as the age group with the highest number of cases. A study from Delhi for over 16 years, that is, 2010–2016 and a study from Nagpur state also states 31–40 as the most affected age group. A study from Tamil Nadu states 21–50 as the commonest age group affected and studies from Ahmedabad and Bengal describes 21–40 as the age group with highest number of cases (10 - 15). There was a male predominance which can be attributed to outdoor work done by them. Similar findings were reported by many authors as Manikandan et al. and Deorukhkar S et al. (16, 17) The majority of them belonged to the rural background, had an Farmer occupation. Agricultural practices in rural areas and humid environments as in the state of Uttarakhand is favorable for the development of Infective Keratitis from minor trauma (11).

Infective Keratitis can be caused by a variety of microorganisms like bacteria, viruses, fungi, or parasites. In this study, of all the cases with established infective aetiology, 50% of cases were attributed to fungal, 44.4% to bacterial, and 5.6% to mixed bacterial and fungal etiology. Similarly, other studies regarding the microbiological profile of Infective Keratitis from Gujarat, Tamil Nadu, and Delhi, state fungal etiology as leading cause followed by bacterial aetiology. Whereas a study from Mysore, Karnataka reports bacterial aetiology as the commonest (18, 19, 20, 21).

Compared to other infective corneal ulcers, fungal corneal ulcers are difficult to diagnose as well as treat. A. Flavus was the most frequently isolated fungus. that is, 22.2% (16) of all fungal isolates in the study. A similar finding has been observed in many studies from the west and south India and neighbor countries with similar climate, where A. Flavus was the commonest fungal isolate (12, 16, 19, 22, 23). While few studies from North India have reported A. Flavus to be the commonest causative agent. A. Flavus are said to be the frequently reported agents of Infective Keratitis in tropical areas. Poor response to medical treatment in fungal keratitis has been documented (14, 15, 20, 24, 25).

Conclusion:

Infective corneal ulcers mainly affected working males involved in farming. Gram stain and KOH mount analysis showed fungal etiology more frequently than bacterial. Detailed history, clinical examination,

and lab investigations of scrapings in cases of infective corneal ulcers are essential to know the clinical and microbiological pattern. Routine microbiological examination of patients with corneal ulcer is necessary in order to analyze and compare the changing trends of the

etiology and their susceptibility patterns. Fungal infections were more common than bacterial. The "regional" findings play an important role in public health implications to understand the etiology better and to initiate appropriate treatment.

Reference:

1. Bakshi R, Rajagopal R, Sitalakshmi G, Sudhi R, Madhavan H, Bagayalakshmi R. Clinical and Microbiological Profile of Fungal Keratitis: A 7 Year Study at a Tertiary Hospital in South India. Cornea Session III;AIOC 2008 Proceedings:207-9.
2. Insan NG, Mane V, Chaudhary BL, Danu MS, Yadav A, Srivastava V. A review of fungal keratitis: Etiology and laboratory diagnosis. Int J Curr Microbiol App Sci. 2013;2:307–314.
3. Yusuf N. Microbial Keratitis in Kingdom of Bahrain: Clinical and Microbiology Study. Middle East African Journal of Ophthalmology 2009;16(1):3-7.
4. Leck AK, Thomas PA, Hagan M, Kaliamurthy J, Ackuaku E, John M, et al. Aetiology of suppurative corneal ulcers in Ghana and south India and epidemiology of fungal keratitis. Br J Ophthalmol. 2002;86:1211–1215.
5. Mehta S, Mehta M. Clinical and Microbiological Profile and Treatment Outcome of Infective Corneal Ulcers: A Study in Central India. Int J Sci Stud. 2017;4(12):234-240. doi: https://doi.org/10.17354/ijss/2017/134.
6. Sihota R, Tandon R. Parsons. Diseases of eye. 22nd edition. Elsevier publications, 2015,pg 198-203.
7. Chander J. Oculomyces, Text book of Medical mycology. 3rd ed. Mehta Publishers: NewDelhi 2002:p.53-67.
8. Clinical laboratory standards institute. Performance standard for antimicrobial susceptibility testing; seventeenth informational supplement M100- S17, vol 27 No.1. Clinical laboratory standards institute. Wayne PA. USA 2007.
9. Kaliamurthy J, Kalavathy CM, Parmar P, Jesudasan CA N, Thomas PA. Spectrum of bacterial keratitis at a tertiary eye care centre in India? BioMed Res Int. 2013;2013:181564. doi: 10.1155/2013.
10. Tewari A, Sood N, Vegad MM, Mehta DC. Epidemiological and microbiological profile of infective keratitis in Ahmedabad. Indian J Ophthalmol. 2012;60:267–72.
11. Chowdhary A, Singh K. Spectrum of fungal keratitis in North India. Cornea. 2005;24:8–15.
12. Bharathi MJ, Ramakrishnan R, Vasu S, Meenakshi R, Palaniappan R. Epidemiological characteristics and laboratory diagnosis of fungal keratitis. a three-year study. Indian J Ophthalmol. 2003;51:315–21.
13. Basak SK, Basak S, Mohanta A, Bhowmick A. Epidemiological and microbiological diagnosis of suppurative keratitis in gangetic West Bengal, Eastern India. Indian J Opthalmol. 2005;53:17–22.
14. Satpathy G, Ahmed NH, Nayak N, Tandon R, Sharma N, Agarwal T, et al. Spectrum of mycotic keratitis in north India: Sixteen years study from a tertiary care ophthalmic centre. J Infect Public Health. 2019;12:367–71.
15. Raut S, Chavan S, Shweta, Khadse R, Tore RP. Mycological profile of corneal ulcer at tertiary care centre in central India. Indian J Appl Res. 2019;9:21–3.
16. Manikandan P, Abdel-hadi A, Babu Singh YR, Revathi R, Anita R, Banawas S, et al. Fungal keratitis: Epidemiology, rapid detection, and antifungal susceptibilities of Fusarium and Aspergillus isolates from corneal scrapings? BioMed Res Int. 2019;2019:6395840. doi: 10.1155/2019/.
17. Deorukhkar S, Katiyar R, Saini S. Epidemiological features and laboratory results of bacterial and fungal keratitis: A five-year study at a rural tertiary -care hospital in western Maharashtra, India. Singapore Med J. 2012;53:264–7.
18. Chidambaram JD, Prajna NV, Srikanthi P, Lanjewar S, Shah M, Elakkiya S, et al. Epidemiology, risk factors, and clinical outcomes in severe microbial keratitis in South India. Ophthalmic Epidemiol. 2018;25:297–305.
19. Katara RS, Patel ND, Sinha M. A Clinical microbiological study of corneal ulcer patients at Western Gujarat, India. Acta Med Iran. 2013;51:399–403.
20. Gupta A, Capoor M R, Gupta S, Kochhar S, Tomer A, Gupta V. Clinico-demographical profile of keratomycosis in Delhi, North India. Indian J Med Microbiol. 2014;32:310–14.
21. Amrutha KB, Venkatesha D. Microbiological profile of ulcerative keratitis in a tertiary care hospital. Int J Res Health Sci. 2014;30:599–603.
22. Ranjini CY, Waddepally VV. Microbial profile of corneal ulcers in a tertiary care hospital in South India. J Ophthalmic Vis Res. 2016;11:363–7.
23. Suwal S, Bhandari D, Thapa P, Shrestha MK, Amatya J. Microbiological profile of corneal ulcer cases diagnosed in a tertiary care ophthalmological institute in Nepal. BMC Ophthalmol. 2016;16:209.
24. Das S, Sharma S, Mahapatra S, Sahu SK. Fusarium keratitis at a tertiary eye care centre in India. Int Ophthalmol. 2014;35:387–89.
25. Gupta IK, Chandra A, Prakash P, Banerjee T, Maurya OPS, Tilak R. Fungal keratitis in north India; Spectrum and diagnosis by Calcofluor white stain. Indian J Med Microbiol. 2015;33:462–3.