PATTERN OF CORNEAL ULCER IN PATIENTS WITH FUNGAL KERATITIS

Shahnaz Gul[1], Manzoor Ali[2], Said Amin[3], Kalim Ullah Khan[3], Ayesha Jamal[4]

ABSTRACT

Background: Infective keratitis is a common ophthalmological condition. It is highly prevalent all over the world.it is one of the common causes of blindness and preventable ocular morbidity worldwide.

Objectives: To determine the frequency of different patterns of scar lesion in fungal keratitis.

Material and methods: This cross-sectional(descriptive) study was conducted at Opthalmology department, Hayatabad Medical Complex, Peshawar from January 2010 to December 2010. Total of 76 patients with microbiological confirmed fungal keratitis were selected by (non-probability) sampling technique.

Results: Out of 76 patients, male were more {49 (64.5%)} than female {27 (35.5%)}, average age was 37.84 ±18.70 years. With respect to site of ulcer 31 (40.8%) were central, 45 (59.2%) were para-central and 0 (0.0%) were peripheral. 9 (11.8%) were rounded, 6 (7.9%) were fluffy, 5 (6.6%) were feathery, 56 (73.7%) were satellite lesions. The margin of ulcer showed that 0 (0.0%) were sharply outlined, 9(11.8%) were serpiginous and 67 (88.2%) were undermined. Satellite type and full thickness keratitis were more common in man as compared to female. Statistical significant variables in men were, the full thickness depth {17 (22.4%) versus 9 (11.8%) and more satellite type lesion {34 (44.7%) versus 22 (28.9%)} (p value 0.000). The central lesion, less than 2mm lesion, deep stromal depth, satellite lesions, undermined margin were more common in patients with age group greater than 45 years. Hypopyon was more statistically associated with ulcer of 3-5mm, deep stromal depth, satellite lesion, and undermined margins (p value <0.05).

Conclusion: The variety of pattern in fungal keratitis showed that fungus keratitis can be present with various patterns. The male dominance is greater in fungal keratitis and hypopyon in more in more extensive ulcer.

Key Words: Fungal keratitis, pattern of ulcer, Microbial keratitis

INTRODUCTION

Corneal blindness is the major cause of visual impairment among the developing nations of the world[5]. Before the development of keratoplasty, corneal opacification was untreatable. The causes of corneal blindness are mainly infective followed by trauma as the next common cause. Survey of available literature quotes infectious keratitis as one of the major causes of avoidable blindness[1]. If properly managed, corneal infections are preventable and curable.

It is one of the common causes of blindness and preventable ocular morbidity worldwide[2]. It is highly prevalent all over the world[3].Infectious diseases, with or without concomitant nutritional deficiency constitute the major cause of blindness in elderly[4]. It even more common in our country[5].

Fungal and bacterial or mixed infection are the common organism involved in infective keratitis. The study have been shown that 34.4%-42.5% of infective keratitis is fungal[6-8]. Corneal injury accounted for 92.15% in fungal keratitis ($p < 0.0001$)[6].

It has been shown that in cases of fungal recurrence, the majority of hyphae (80%) grew vertically. There was a higher recurrence rate in patients with vertically growing hyphae (46.2%) than in those with horizontally growing hyphae (2% , $P<0.001$)[9]. Hyphal growth is not only different same fungal genus but also in same species[9]. The fungal recurrence rate after keratoplasty in patients with hyphae growing horizontally is much lower than that in those with hyphae growing vertically[9]. There for patterns of fungal pathogens may be an important factor for fungal recurrence after keratoplasty[9].

This study will deal with pattern of fungal keratitis in patient presenting to ophthalmology department of Hayatabad Medical Complex, Peshawar. This will let us know about the common pattern in fungal keratitis in our papulation and thus pre-planning for the reoccurrence

[1] (Ophthalmology) Senior Registrar, Pak International Medical College, Peshawar
[2] District specialist Ophthalmology, District Headquarter hospital, Swabi
[3] Department of Medicine, Hayatabad Medical Complex, Peshawar
[4] Final Professional year MBBS, Rehman Medical Institute, Peshawar

Address for correspondence:
Dr Shahnaz Gul
(Ophthalmology) Senior Registrar, Pak International Medical College, Peshawar
Email: shahnaz.gul@icloud.com
Cell# 03078366770

of fungal keratitis.

METHODOLOGY

This Cross-sectional study was conducted in Hayatabad Medical Complex, Peshawar from 1st January 2010 to 31 December 2010. All the patient present to eye department for possible fungal keratitis were included in the study. Fungal keratitis was defined as when examination of cornea revealed grey white, dry appearing infiltrate with feathery margins with multifocal or satellite infiltrates (which may occasionally be present) detected by slit lamp examination and microscopy. All those with non-infective traumatic corneal abrasions, non-fungal, non-suppurative keratitis including viral ulcers and patient with Corneal dystrophies and degenerations were excluded from the study. Complete local examination of the eye was carried out using a slit lamp and indirect ophthalmoscopy. Eye lids, lacrimal apparatus, ocular movements and conjunctiva was checked and any infective pathology would be noted. Details of ulcer was recorded: this was included ulcer size in two dimensions in millimeters measured with the slit beam of slit lamp. Site of the ulcer was recorded according to the quadrant of the cornea involved. Depth of the ulcer was recorded with the help of the optical section of the slit beam. Margins of the ulcer was recorded as sharply defined, serpiginous or undermined. Any reactionary changes in the anterior chamber like cells, flare an hypopyon was also noted.

RESULTS

Out of 76 patients, males were more {49 (64.5%)} than female {27 (35.5%)}, average age was 37.84 ±18.70 years. The average ulcer size was 3.74 ±1.09mm. With respect to site of ulcer 31 (40.8%) were central, 45 (59.2%) were Para-central and 0 (0.0%) were peripheral. The ≤2mm size ulcer were 27 (35.5%), the 3-5mm size ulcer were 39 (51.3%), the >5mm sized ulcer were 10 (13.2%). 0 (0.0%) superficial, 14 (18.4%) were anterior stromal, 36 (47.4%) were deep stromal and 26 (34.2%) were full thickness. With regard to pattern of ulcer 9 (11.8%) were rounded, 6 (7.9%) were fluffy, 5 (6.6%) were feathery, 56 (73.7%) were satellite lesions. The margin of ulcer showed that 0 (0.0%) were sharply outlined, 9(11.8%) were serpiginous and 67 (88.2%) were undermined. Anterior chamber involve-

Table 1: frequency of pattern of ulcers

		Count (Percentage of total in the same sub-table)
Sex	Male	49 (64.5%)
	Female	27 (35.5%)
Site of Ulcer	Central	31 (40.8%)
	Paracentral	45 (59.2%)
	Peripheral	0 (0.0%)
Size of Ulcer	≤2mm	27 (35.5%)
	3-5mm	39 (51.3%)
	>5mm	10 (13.2%)
Depth of Ulcer	Superficial	0 (0.0%)
	Anterior Stromal	14 (18.4%)
	Deep Stromal	36 (47.4%)
	Full Thickness	26 (34.2%)
Pattern of ulcer	Round	9 (11.8%)
	Fluffy	6 (7.9%)
	Feathery	5 (6.6%)
	Satellite lesions	56 (73.7%)
Margin of Ulcer	sharply outlined	0 (0.0%)
	Serpiginous	9(11.8%)
	Undermined	67 (88.2%)
Anterior Chamber	Cells	0 (0.0%)
	Flare	0 (0.0%)
	Hypopyon	24 (31.6%)
	Not Visible	52 (68.4%)

Table 2: pattern of Ulcer versus Gender

		Sex		P value
		Male	Female	
		Count Subtable Valid N %	Count Subtable Valid N %	
Site of Ulcer	Centeral	22 (28.9%)	9 (11.8%)	0.323
	Paracentral	27 (35.5%)	18 (23.7%)	
	Peripheral	0 (0.0%)	0 (0.0%)	
Size of Ulcer	≤2mm	13 (17.1%)	14 (18.4%)	0.052
	3-5mm	30 (39.5%)	9(11.8%)	
	>5mm	6 (7.9%)	4 (5.3%)	
Depth of Ulcer	Superficial	0 (0.0%)	0 (0.0%)	0.000
	Anterior Stromal	14 (18.4%)	0 (0.0%)	
	Deep Stromal	18 (23.7%)	18 (23.7%)	
	Full Thickness	17 (22.4%)	9 (11.8%)	
Pattern of ulcer	Round	9 (11.8%)	0 (0.0%)	0.000
	Fluffy	1 (1.3%)	5 (6.6%)	
	Feathery	5 (6.6%)	0 (0.0%)	
	Satellite lesions	34 (44.7%)	22 (28.9%)	
Margin of Ulcer	sharply outlined	0 (0.0%)	0 (0.0%)	0.557
	Serpiginous	5 (6.6%)	4 (5.3%)	
	Undermined	44 (57.9%)	23 (30.3%)	
Anterior Chamber	Cells	0 (0.0%)	0 (0.0%)	0.062
	Flare	0 (0.0%)	0 (0.0%)	
	Hypopyon	19 (25.0%)	5 (6.6%)	
	Not Visible	30 (39.5%)	22 (28.9%)	

Table 3: frequency of ulcer versus age groups

		Age (in years)				P value
		≤15.00	15.01 - 30.00	30.01 - 45.00	45.01+	
		Count Subtable Valid N %	Count Subtable Valid N %	Count Subtable Valid N %	Count Subtable Valid N %	
Site of Ulcer	Centeral	4 (5.3%)	0 (0.0%)	9 (11.8%)	18 (23.7%)	0.000
	Paracentral	9 (11.8%)	13 (17.1%)	8 (10.5%)	15 (19.7%)	
	Peripheral	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Size of Ulcer	<2mm	0 (0.0%)	0 (0.0%)	8 (10.5%)	19 (25.0%)	0.000
	3-5mm	9 (11.8%)	12 (15.8%)	4 (5.3%)	14 (18.4%)	
	>5mm	4 (5.3%)	1 (1.3%)	5 (6.6%)	0 (0.0%)	
Depth of Ulcer	Superficial	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.000
	Anterior Stromal	0 (0.0%)	0 (0.0%)	4 (5.3%)	10 (13.2%)	
	Deep Stromal	9 (11.8%)	5 (6.6%)	4 (5.3%)	18 (23.7%)	
	Full Thickness	4 (5.3%)	8 (10.5%)	9 (11.8%)	5 (6.6%)	

Pattern of ulcer	Round	4 (5.3%)	0 (0.0%)	5 (6.6%)	0 (0.0%)	0.000
	Fluffy	0 (0.0%)	1 (1.3%)	0 (0.0%)	5 (6.6%)	
	Feathery	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (6.6%)	
	Satelllite lesions	9 (11.8%)	12 (15.8%)	12 (15.8%)	23 (30.3%)	
Margin of Ulcer	sharply out-lined	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.001
	Serpiginous	0 (0.0%)	0 (0.0%)	0 (0.0%)	9 (11.8%)	
	Undermined	13 (17.1%)	13 (17.1%)	17 (22.4%)	24 (31.6%)	
Anterior Chamber	Cells	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.036
	Flare	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	Hypopyon	5 (6.6%)	5 (6.6%)	9 (11.8%)	5 (6.6%)	
	Not Visible	8 (10.5%)	8 (10.5%)	8 (10.5%)	28 (36.8%)	

Table 4: Ulcer pattern versus Anterior Chamber involvment

		Anterior Chamber				
		Cells	**Flare**	**Hypopyon**	**Not Visible**	
		Count	**Count**	**Count**	**Count**	
Site of Ulcer	Centeral	0	0	9	22	0692
	Paracentral	0	0	15	30	
	Peripheral	0	0	0	0	
Size of Ulcer	<2mm	0	0	4	23	0.021
	3-5mm	0	0	14	25	
	>5mm	0	0	6	4	
Depth of Ulcer	Superficial	0	0	0	0	0.002
	Anterior Stro-mal	0	0	0	14	
	Deep Stromal	0	0	15	21	
	Full Thickness	0	0	9	17	
Pattern of ulcer	Round	0	0	5	4	0.001
	Fluffy	0	0	1	5	
	Feathery	0	0	5	0	
	Satelllite lesions	0	0	13	43	
Margin of Ulcer	sharply out-lined	0	0	0	0	0.007
	Serpiginous	0	0	0	9	
	Undermined	0	0	24	43	

ment showed, cells and flare in 0 (0.0%), hypopyon in 24 (31.6%) and in 52 (68.4%) it was not visible (table 1). Satellite type and full thickness keratitis were more common in man as compared to female.

The relationship of sex and age studies with the pattern of keratitis it has been shown in table. Statistical significant variables in men were, the full thickness deepness {17 (22.4%) versus 9 (11.8%) and more satellite type lesion {34 (44.7%) versus 22 (28.9%)} (p value 0.000) (table 2).

The Central lesion (23.7%), less than 2mm lesion (25.0%), deep stromal depth (23.7%), Satellite lesions (30.3%), undermined margin (31.6%) were more common in patients with age group greater than 45 years

(table 3).

Hypopyon was more statistically associated with ulcer of 3-5mm, deep stromal depth, satellite lesion, and undermined margin (p value <0.05), (table 4)

DISCUSSION

In this study the average age was average age was 37.84 ±18.70 years which is similar to the study conducted by Bharathi MJ et al. which shows a large proportion of the patients (732; 66.85%) were in the younger age group (21 to 50 years) [7], also by Chowdhary A where Young adults 31–40 years of age were the most common age group to be involved (36%)[10] and also by Bharathi MJ in which most of the patients (66.84%) with fungal keratitis were between 21 and 50 years old[6].

In this study male were 64.5% while female were 35.5%, this result is consistent with the finding found by Bharathi MJ et al. in which males (712; 65.08%) were more often affected (P< 0.0001)[7] and also by in which male (68%) were more commonly affected by fungal keratitis than women (32%)[10]. This is in accord with prior studies[8, 11] and from other parts of the world[11], where male preponderance has been established in a ratio ranging from 1.5:1 to 4.5:1 but in variance with the findings of Poria et al[12]. from this region, Al-Yousuf[13]. ,R.Maske et al[14]. and Subbannaya et al[15]. who found females to be more affected.

In our study the satellite lesions was more frequent, this is in consistent with study by PA Thomson in which satellite lesions and Serrated margins were more common[16].

In our study average scar size was 3.74 ±1.09mm which was almost similar to that noted by Venkatesh Prajna N ,the means scare size was 3.49 mm (4.03 mm), with an interquartile range of 2.67 mm[17].

The limitation of my study is that the presence of fungi was not culture confirmed so the result may not by specific to fungi only, there may be bacterial or non-infections cause there.

CONCLUSION

The variety of pattern in fungal keratitis showed that fungus keratitis can be present with various patterns. The male dominance is greater in fungal keratitis and hypopyon in more in more extensive ulcer.

REFERENCES

1. Gopinathan U, Sharma S, Garg P, Rao GN. Review of epidemiological features, microbiological diagnosis and treatment outcome of microbial keratitis: experience of over a decade. Indian J Ophthalmol. 2009;57(4):273.
2. Green M, Apel A, Stapleton F. A longitudinal study of trends in keratitis in Australia. Cornea. 2008;27(1):33-9.
3. Green M, Apel A, Stapleton F. Risk factors and causative organisms in microbial keratitis. Cornea. 2008;27(1):22-7.
4. Butler T, Spencer N, Chan C, Gilhotra JS, McClellan K. Infective keratitis in older patients: a 4 year review, 1998–2002. Br J Ophthalmol. 2005;89(5):591-6.
5. Naimat K AF, Amin MS. Microbial keratitis. Professional Med J. 2006;13(1):101-7.
6. Bharathi MJ, Ramakrishnan R, Meenakshi R, Padmavathy S, Shivakumar C, Srinivasan M. Microbial keratitis in South India: influence of risk factors, climate, and geographical variation. Ophthalmic Epidemiol. 2007;14(2):61-9.
7. 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(4):315.
8. Basak SK, Basak S, Mohanta A, Bhowmick A. Epidemiological and microbiological diagnosis of suppurative keratitis in Gangetic West Bengal, eastern India. Indian J Ophthalmol. 2005;53(1):17.
9. Xie L, Zhai H, Shi W, Zhao J, Sun S, Zang X. Hyphal Growth Patterns and Recurrence of Fungal Keratitis after Lamellar Keratoplasty. Ophthalmology. 2008;115(6):983-7.
10. Chowdhary A, Singh K. Spectrum of Fungal Keratitis in North India. Cornea. 2005;24(1):8-15.
11. Bharathi M, Ramakrishnan R, Vasu S. Aetiological diagnosis of microbial keratitis in South India-A study of 1618 cases. Indian J Med Microbiol. 2002;20(1):19.
12. Zaher SS, Sandinha T, Roberts F, Ramaesh K. Herpes simplex keratitis misdiagnosed as rheumatoid arthritis-related peripheral ulcerative keratitis. Cornea. 2005;24(8):1015-7.
13. Al-Yousuf N. Microbial keratitis in kingdom of bahrain: clinical and microbiology study. Middle East African journal of ophthalmology. 2009;16(1):3.
14. Maske R, Hill J, Oliver S. Management of bacterial corneal ulcers. Br J Ophthalmol. 1986;70(3):199-201.
15. Kotigadde S, Ballal M, Kumar A, PN SR, Shivananda P. Mycotic keratitis: a study in coastal Karnataka. Indian J Ophthalmol. 1992;40(1):31.
16. Thomas P, Leck A, Myatt M. Characteristic clinical features as an aid to the diagnosis of suppurative keratitis caused by filamentous fungi. Br J Ophthalmol. 2005;89(12):1554-8.
17. Venkatesh Prajna N, Krishnan T, Mascarenhas J, Srinivasan M, Oldenburg CE, Toutain-Kidd CM, et al. Predictors of outcome in fungal keratitis. Eye. 2012;26:1226.