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Research Article

A Clinical Profile of Corneal Ulcer in a Rural Tertiary Care Hospital

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Abstract

Introduction: Cornea is responsible for three quarters of dioptric power of the eye and hence any injury to it can cause considerable visual disturbances. Avascularity, while absolutely essential for optical purposes is boon to multiplying organisms. In India there are about 18.7 million blind people. The incidence of corneal blindness is 15.4%, the corneal ulcer contributing (9.34%), corneal dystrophy (0.49%), keratomalacia (1.68%), corneal opacity (3.67%) and others like keratoconus (0.09%) of this. Corneal blindness is a major problem in India, which adds a substantial burden to the community in general and health care resources all over the world. Further, individuals with corneal blindness are usually of a younger age group compared with those suffering from cataract. Hence, in terms blind years the impact of corneal blindness is greater.

Objectives:

1. To study the clinical features, etiology and microbiological profile of suppurative keratitis.
2. To study the course, final visual and therapeutic outcome of the cases.
3. To study the various factors affecting the outcomes and their relationship with the micro biological profile and clinical appearance.
4. To identify the signs and symptoms (which carry a poorer prognosis or may indicate a fulminant course).

Materials and Methods: A prospective observational study was conducted at Department of Ophthalmic, PES Institute of Medical Sciences and Research, Kuppam study period between Jan 2018 - 2019. A total 80 subjects who diagnosed has corneal ulcer attending in department of ophthalmology, PESIMSR. The following inclusion and exclusion criteria was used to conduct the research programme inclusion criteria: All cases of suspected Microbial keratitis visiting cornea clinic between January 2018 to June 2019. Exclusion criteria: All cases of clinically suspected non-bacterial and non-fungal keratitis, known cases of degeneration ulcer like Moorens ulcer and Terriens. Patients below 18 years of age and patients unable to give valid consent and one eyed patients.

Results: Total 85 cases was considered for the study group. Out of which male comprises 52 (61.18%) and female was 33 (38.82%) with sex ratio 1:2. The significance was tested based on the logistic regression analysis. Irrespective of gender it was found that incidence and exposure of culture organisms was statistically significant ($p < 0.01$). The laterality was Correlated between Culture organisms, the analysis was done multivariate logistic regression method. As per the resulted findings, the most occurrences of the organisms was *Fusarium* 23 (27.06%) ($p < 0.01$) followed by *Bacillus* species 14 (16.47%) ($p < 0.01$), *Aspergillums fumigates* 12 (14.12%) ($p < 0.01$), *Strep. epidermidis* 13 (15.29%) ($p < 0.01$), *Staph aureus* 11 (12.94%) ($p < 0.01$), *Aspergillums flavus* 8 (9.41%) ($p < 0.01$) and fewer number of organisms are showed to be *Strep. pneumococcus* 4 (4.71%) ($p < 0.01$). The occurrence of the organisms when compared with laterality and other associated factors is found to be statistically significant.

Conclusion: The definitive diagnosis of ulcers caused by multiple organisms can only be arrived at by microbiological evaluation. Accurate diagnostic tests not only play a key role in patient management but also reduce the risk of the patient developing long-term complications.

Keywords: Organisms; Cornea; Incidence; Culture Organisms; Prevalence

Introduction

Cornea is responsible for three quarters of dioptric power of the eye and hence any injury to it can cause considerable visual disturbances. Avascularity, while absolutely essential for optical purposes is boon to multiplying organisms. In India there are about 18.7 million blind people. The incidence of corneal blindness is 15.4%, the corneal ulcer contributing (9.34%), corneal dystrophy (0.49%), keratomalacia (1.68%), corneal opacity (3.67%) and others like keratoconus (0.09%) of this. Corneal blindness is a major problem in India, which adds a substantial burden to the community in general and health care resources all over the world. Further, individuals with corneal blindness are usually of a younger age group compared with those suffering from cataract. Hence, in terms blind years the impact of corneal blindness is greater.

The commonest cause of corneal blindness is infection made worse by malnutrition due to poverty and ignorance. Bacterial infections are quite frequently encountered and are an important preventable cause of mono ocular blindness. In the developing world corneal ulcers appear to be a occurring in epidemic proportions, suppurative keratitis is the major cause of corneal blindness. While contact lens use is a major cause of corneal blindness in the developing world, a high prevalence of fungal infections, agriculture related trauma, and use of traditional eye medicines is unique in the developing world. Pathogens will get entry into the cornea because of the corneal epithelial layer barrier break, but few bacteria namely *Neisseria gonorrhoea, Neisseria meningitides*, and *Corynebacterium diphtheria* can invade the intact cornea.

Other causes like foreign body, erosions and abrasions due to trauma can lead to intact epithelial barrier break and can cause the bacterial keratitis. The infected lacrimal sac can be a cause for bacterial keratitis in corneal epithelial layer break. Corneal ulceration occurs due to the host cellular and immunological responses to the offending agent. Severity of the ulceration depends on the virulence of a offending agent, and host response. Hypopyon can be seen in severe degree corneal ulcer.

Acanthamoeba is a ubiquitous, protozoa and have been isolated from soil, water, air and dust. Fungal infections are common in tropical climatic regions and affect the immunosuppressed state, topical steroid use or trauma with a vegetable matter. Prompt treatment is essential for all forms of corneal ulcer to prevent complications and permanent visual impairment. Usually consists of systemic and topical broad-spectrum antibiotics until culture results identify the causative organisms. The goals of treatment are to eliminate the underlying cause of the ulcer and to relieve pain. Severe fungal keratitis on presentation and inadequate response to current anti-fungal which are fungistatic is a major cause for poor response to fungal keratitis, which may lead to perforation or panophthalmitis. Corneal ulcers by fusarium species. one of the most virulent ocular pathogens underscores the need for more effective methods of diagnosis and treatment to decrease the burden of avoidable blindness. The cornel stroma is approximately 500micrometer thick and comprises 90% thickness of the cornea and is located between the bowmanns layer and descemets membrane. It is composed of lamellae formed from flattened bundles of collagen, stromal keratocytes and ground substances like keratan sulphate. Collagen is the major structural component of corneal stroma. There are 200 to 250 bundles of collagen fibrils. Each bundle extends the width of the cornea and is 2 nm thick 9 to 260 nm wide. The collagen fibrils are arranged in a regular manner, parallel to the corneal surface. Such arrangements and equal spacing of collagen fibers creates a lattice or three-dimensional diffracting grating, which is responsible for the ability of cornea to scatter 90% of the incoming light rays. The lamellae in the posterior part of the stroma have an orthogonal layering i.e. the bundles are at right angles to each other. In the anterior one third of the stroma, the lamellae have a more oblique layering. The glycosaminoglycans of the stroma are keratin sulphate and chondroitin sulphate, which occur in the ratio 3:1. keratocytes occupy 3 - 5% of the stromal volume. They are responsible for the maintenance of stromal components and they synthesize collagen degradative enzymes such as matrix metalloproteases. The MMPs are particularly important in the pathogenesis of peripheral ulcerative keratitis as they accumulate in the tears and trigger an autoimmune response involving the ocular tissue. Keratocytes usually lie between the lamellae being flat with long attenuated processes extending from a central cell body in all directions. Depletion of keratocytes is a characteristics feature of acanthamoeba keratitis.

Aim of the Study

The present study aims to study the following objectives (i) study the clinical features, etiology and microbiological profile of suppurative keratitis (ii) to study the course, final visual and therapeutic outcome of the cases (iii) to study the various factors affecting the outcomes and their relationship with the micro biological profile and clinical appearance and (iv) to identify the signs and symptoms (which carry a poorer prognosis or may indicate a fulminant course).

Materials and Methods

A prospective observational study was conducted at Department of Ophthalmic, PES Institute of Medical Sciences and Research, Kuppam study period between January 2018 - 2019. A total

80 subjects who diagnosed has corneal ulcer attending in department of ophthalmology, PESIMSR. The following inclusion and exclusion criteria was used to conduct the research programme, Inclusion criteria; All cases of suspected Microbial keratitis visiting cornea clinic between January 2018 to June 2019; Exclusion criteria; All cases of clinically suspected non-bacterial and non-fungal keratitis, Known cases of degeneration ulcer like Moorens ulcer and Terriens, Patients below 18 years of age and Patients unable to give valid consent and One eyed patients.

Sample size calculation- Information available; the prevalence of 32.4% bacterial expected assumption

$$n = \frac{Z^2_{1-\alpha/2} * p\,(1-p)}{d^2}$$

n = Sample size.

z value for 95% CI = 1.96

Expected prevalence = 0.324 (32.4%)

Precision (d) = 0.1 (10%)

n = $\frac{1.96^2 * 0.324\ (1-0.324)}{0.10^2}$ = 84.14 (sample size)

Sampling technique convenient sampling was used to selection of the cases or subjects

Data collection

After the approval of the Ethical committee of the PES Institute of Medical Sciences and Research, written consent is obtained from the patient fulfilling the inclusion criteria to enroll in the study. Each subject will undergo a comprehensive. The following ophthalmic examination was consider for evaluating the cases:

1. Visual acuity-Snellens chart or tumbling E chart Complete slit lamp examination to clinically categories as bacterial or fungal.
2. Corneal scraping and wet mounts for Gram stain and KOH.
3. Culture with blood agar, chocolate agar for bacteria and fungi, enrichment media if necessary in case of parasites.
4. Anterior chamber tap/corneal button culture in cases of therapeutic keratoplasty.

Based on the clinical appearance, Keratitis will be managed according to suitable organisms and severity. All patients will be assessed on the 1st day, 1st week/ at discharge, 1 month, 3 months. Similar examination is to be done at each follow up visit.

Tools and techniques to be used

1. Slit lamp photography
2. Corneal scraping with grams stain and KOH stain of the scraped material.

Plan of analysis of data

The descriptive data was analyzed by SPSS software: Univariate analysis was done for categorical data. Mean and standard deviation was used to know the variation of the parameters. The chi-square test and t- test was used to draw the significant inference.

Results

Age class	No	%	P-Value
18 - 30 Years	13	15.29	≤ 0.0001
31 - 40 Years	08	9.41	≥ 0.001
41 - 50 Years	27	31.76	≤ 0.0001
51 - 60 Years	18	21.18	≤ 0.0001
61 - 70 Years	12	14.12	≤ 0.0001
> 71 Years	07	8.24	≥ 0.001
Total	85	100.00	

Table 1: Age wise distribution of cases.

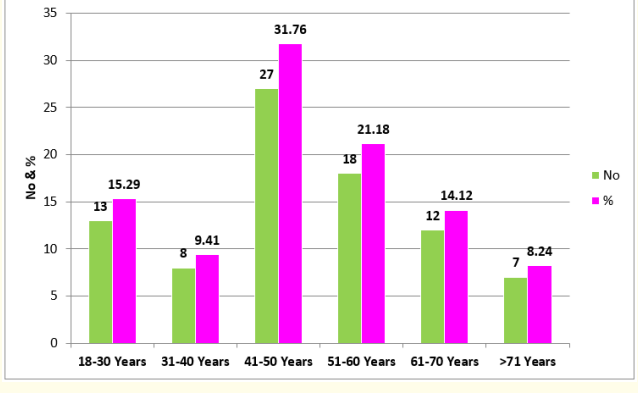

Figure 1: Age wise break up bar chart.

From (Table 1) the analysis was done SPSS -16.50 versions, age classes was categorized based on the mean and SD of the data sets. As per the resulted findings, the mean age of the cases was 56.21 with SD 2.25 years. Majority of the cases fall on the age group between 41 - 50 years 27 (31.76%) followed by 51 - 60 years was 18 (21.18%); 18-30years 13 (15.29%). All the age group was found to be statistically significant with respect to study objectives ($p < 0.01$).

Gender	No	%	P-value
Male	52	61.18	≤ 0.0001
Female	33	38.82	

Table 2: Gender wise distribution.

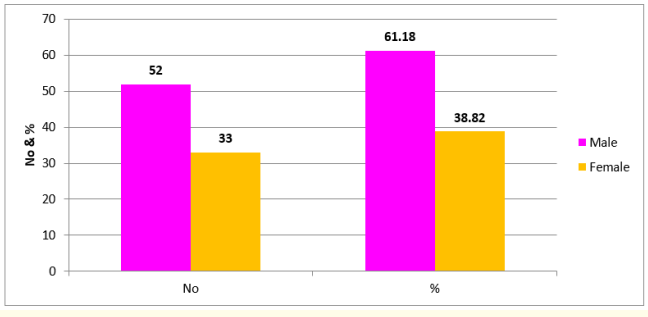

Figure 2: Gender wise distribution of cases.

From (Table 2) depicted that a total 85 cases was considered for the study group. Out of which male comprises 52 (61.18%) and female was 33 (38.82%) with sex ratio 1:2. The significance was tested based on the logistic regression analysis. Irrespective of gender it was found that incidence and exposure of culture organisms was statistically significant ($p < 0.01$).

Occupation	No	%	P-value
Students	13	15.29	≤ 0.00
Agriculturist	23	27.06	≤ 0.00
Businessman	17	20.00	≤ 0.00
Housewife	19	22.35	≤ 0.00
Labourer	13	15.29	≤ 0.00
Total	85	100.00	

Table 3: Occupation status.

Figure 3: Frequency distribution of occupation.

The socioeconomic data was collected from the tested questionnaires, as per the findings of the results it was clearly depicted that, the occupation was found to be statistically significant ($p < 0.01$), majority of the cases persuaded Agriculture occupation 3 (27.06%) followed by house wife 19 (22.35%), laborer 13 (15.29%) and student was 13 (15.29%) respectively (Table 3).

SES	No	%	P-value
Low Income	34	40	≤ 0.00
Mid income	51	60	≤ 0.00
Total	85	100	

Table 4: Socio economic status.

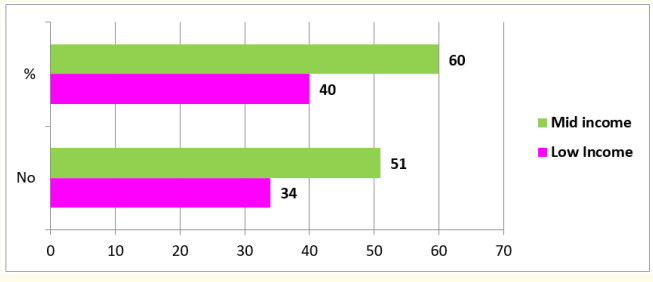

Figure 4: SE status of the cases.

The socioeconomic data was poled and it was categorized in to group based on the mean score of the subjects. The correlation of economic status and study objectives was analysed by using paired t test as per the findings of the results it was clearly depicted that, the occupation was found to be statistically significant ($p < 0.01$), majority of the cases persuaded Agriculture occupation 3 (27.06%) followed by house wife 19 (22.35%), laborer 13 (15.29%) and student was 13 (15.29%) respectively (Table 4).

Laterality	No	Male	Female	P-value
LE	38	26	12	≤ 0.00
RE	47	26	21	≤ 0.00
Total	85	52	33	

Table 5: Distribution of laterality with respect to gender.

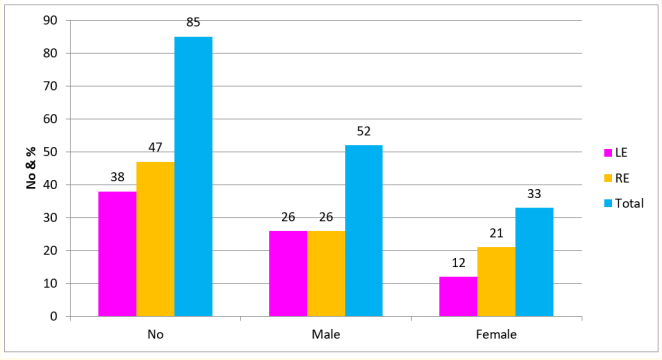

Figure 5: Distribution of laterality.

From (Table 5) showed distribution of laterality with respect to gender, total right eye was 38 (44.70) and left eye laterality was 47 (55.29%) in which male and female comprises of LE was 26 (68.42%) and 12 (31.57%) respectively. In case of RE a total comprises of male 26 (55.13%) and female was 21 (44.68%). The laterality was found to be statistically significant ($p < 0.01$).

Laterality	Location			P-value
	Central	Para central	Total	
LE	21	17	38	≤ 0.00
RE	20	27	47	≤ 0.00
Total	41	44	85	

Table 6: Relation between laterality versus location.

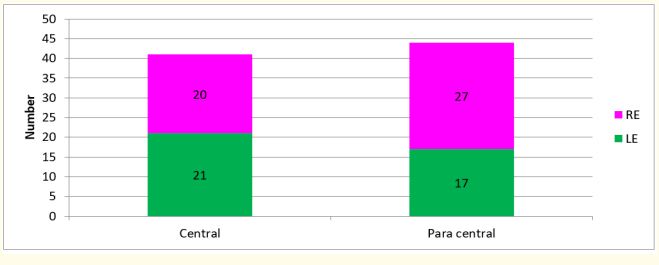

Figure 6: Correlation between laterality versus location status.

From (Table 6) determined that laterality was correlated with location, the analysis was done multivariate logistic regression. As per the resulted findings, the central location in association with LE was 21 cases and par central was 17 cases were seen. Similarly, RE the central was 20 and par central was 27 cases were seen. When compared to location with laterality, the hypothesis was found to be statistically significant ($p < 0.01$). There is no any differences between the location and laterality of the eyes.

Laterality	Predisposing factors				P-value
	Diabetes	Trauma	None	Total	
LE	6	30	2	38	≤ 0.001
RE	5	36	6	47	≤ 0.001
Total	11	66	8	85	

Table 7: Laterality versus predisposing factors.

Figure 7: Status of pre-disposing factors.

From (Table 7) determined that, the laterality with predisposing factors, the analysis was done multivariate logistic regression method. As per the resulted findings, the trauma in association with LE and RE were showed significant differences. A majority of the cases were seen trauma 30 (32.29%); 36 (42.35%) in both LE and RE. Statistically when compared to predisposing factors with laterality, the hypothesis was found to be statistically significant ($p < 0.01$). There is a significance differences were seen in the predisposing factors and laterality of the eyes

Laterality	Grade				P-value
	Mild	Moderate	Severe	Total	
LE	10	14	14	38	≤ 0.000
RE	15	24	8	47	≤ 0.000
Total	25	38	22	85	

Table 8: Laterality correlation with grades.

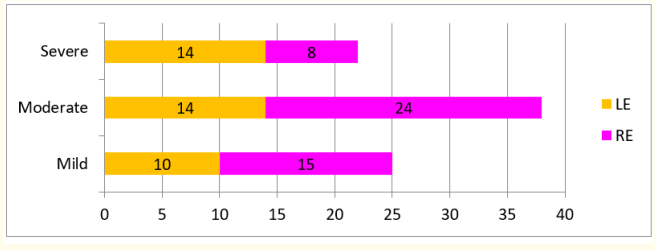

Figure 8: Correlation with grades and laterality.

From (Table 8) determined that, the laterality correlation with grades, the analysis was done logistic regression method. As per the resulted findings, a total 25 cases were seen mild; moderate 38 and severe grade was 22, the grades in correlation with LE and RE were showed to be significant differences ($p < 0.012$) A majority of the cases were seen moderate followed by mild. Statistically when compared to grades with laterality and occurrence of microorganisms, the hypothesis was found to be statistically significant ($p < 0.01$). There is a significant differences were seen in the grades, occurrence of microorganism and laterality of RE and LE of both the eyes.

Organism	LE		RE		Total		P-Value
	No	%	No	%	No	%	
Aspergillus flavus	3	3.53	5	5.88	8	9.41	≥ 0.000
Aspergillus fumigatus	9	10.59	3	3.53	12	14.12	≤ 0.000
Bacillus species	4	4.71	10	11.76	14	16.47	≤ 0.000
Fusarium	12	14.12	11	12.94	23	27.06	≤ 0.000
Staph aureus	6	7.06	5	5.88	11	12.94	≥ 0.000
Strep. epidermidis	3	3.53	10	11.76	13	15.29	≥ 0.000
Strep. pneumococcus	2	2.35	2	2.35	4	4.71	≥ 0.000
Total	39	45.88	46	54.12	85	100	

Table 9: Correlation between culture organisms versus laterality of RE, LE.

From (Table 9) determined that, the laterality was Correlated between Culture organisms, the analysis was done multivariate logistic regression method. As per the resulted findings, the most occurrence of the organisms was fusarium 23 (27.06%) ($p < 0.01$) followed by *Bacillus* species 14 (16.47%) ($p < 0.01$), *Aspergillums fumigates* 12 (14.12%) ($p < 0.01$), *Strep. epidermidis* 13 (15.29%) ($p < 0.01$), *Staph aureus* 11 (12.94%) ($p < 0.01$), *Aspergillums flavus* 8 (9.41%) ($p < 0.01$) and fewer number of organisms are showed to be *Strep. pneumococcus* 4 (4.71%) ($p < 0.01$). The occurrence of the organisms when compared with laterality and other associated factors is found to be statistically significant.

From (Table 10) determined that, the correlation between organism and nature of injury was done multivariate logistic regression method. As per the resulted findings, the most favored injuries for the causation of the severity was vegetative matter 25 (29.41%) ($p < 0.01$), stone 19 (22.35%) ($p < 0.01$), stick 12 (14.11%) ($p < 0.01$), insect 8 (9.41%) ($p < 0.01$), grass 10 (11.76%) ($p < 0.01$) and animal tail was 3 (3.52%) ($p > 0.001$) respectively. All injuries except animal tail were found to be statistically significant, 13.68% association with the injury and occurrence of the infection.

From (Table 11) determined that, diagnosis versus microorganisms was done multivariate logistic regression method. As per the

Organism	Vegetative matter	Stone	Stick	Insect	Grass	Animal tail	Nil	Total
Aspergillus flavus	3 (3.52%)	0	0	1 (1.17%)	3 (3.52%)	0	1 (1.17%)	8 (9.41%)
Aspergillus fumigatus	6	0	2 (2.35%)	0	2 (2.35%)	0	1 (1.17%)	11 (12.94%)
Bacillus species	0	4 (4.70%)	4 (4.70%)	3 (3.52%)	0 (%)	2 (2.35%)	1 (1.17%)	14 (16.47%)
Fusarium	16 (18.82%)	0	3 (3.52%)	0 (%)	4 (4.70%)	0	0	23 (27.05%)
Staph aureus	0	4 (4.70%)	1 (1.17%)	0 (%)	0 (%)	1	5 (5.88%)	11 (12.94%)
Strep. epidermidis	0	8	1 (1.17%)	3 (3.52%)	1 (1.17%)	0	0	13 (15.29%)
Strep. pneumococcus	0	3	1 (1.17%)	1 (1.17%)	0 (%)	0	0	5 (5.88%)
Total	25 (29.41%)	19 (22.35%)	12 (14.11%)	8 (9.41%)	10 (11.76%)	3 (3.52%)	8 (9.41%)	85
Chi-square	13.68, $p < 0.001$							

Table 10: Correlation between organism and nature of injury.

Organisms	Bacterial corneal ulcer		Fungal corneal ulcer		Total		P-value
	No	%	No	%	No	%	
Aspergillus flavus	0	0.00	8	9.41	8	9.41	≤ 0.00
Aspergillus fumigatus	0	0.00	11	12.94	11	12.94	≤ 0.00
Bacillus species	14	16.47	0	0.00	14	16.47	≤ 0.00
Fusarium	0	0.00	23	27.06	23	27.06	≤ 0.00
Staph aureus	11	12.94	0	0.00	11	12.94	≤ 0.00
Strep. epidermidis	12	14.12	1	1.18	13	15.29	≤ 0.00
Strep. pneumococcus	5	5.88	0	0.00	5	5.88	≤ 0.00
Total	42	49.41	43	50.59	85	100.00	
Chi square	18.06, $p < 0.001$						

Table 11: Diagnosis versus microorganisms.

Culture	Trauma	Diabetes	Nil	Total
Aspergillus flavus	8	0	0	8
Aspergillus fumigatus	9	1	1	11
Bacillus species	8	4	2	14
Fusarium	18	4	1	23
Staph aureus	6	1	4	11
Strep. epidermidis	13	0	0	13
Strep. pneumococcus	4	1	0	5
Total	66 (77.64%)	11 (12.94%)	8 (9.41%)	85 (%)
Chi-square	10.78, $p < 0.01$			

Table 12: Culture microorganisms correlation with predisposing factors.

resulted findings, the total bacterial corneal ulcer expression was 42 (49.41%) and fungal corneal ulcer was 43 (50.59%). Statistically when we compared bacterial corneal ulcer with fungal corneal ulcer results were found to be statistically significant, 18.06% association with Diagnosis versus microorganisms.

From (Table 12) determined that, culture correlation with predisposing factors paired t test. As per the resulted findings, the total trauma expression was 66 (77.64%) and diabetes was 11 (12.94%). Statistically when we compared trauma with diabetes results were found to be statistically significant, 10.1786% association with predisposing factors and culture.

Figure 9: Fungal ulcer.

Figure 10: Slit lamp biomicroscopy of cornea case.

Discussion

The corneal ulcer is a sight threatening condition presenting in all age groups and irrespective of the gender at global level and inclusion with Indian sub-continent. Intervention may resolve without any sequelae or progress to perforation and leads to dreaded complication like endophthalmitis and ultimately leads to blindness [1-3]. Corneal ulceration is a significant cause of corneal blindness [4-6]. The spectrum of microbial corneal correlation findings had varies with geographical location, influenced by the local climate and occupational risk factors [7]. Corneal blindness due to infectious keratitis has been more commonly reported in the rural population, particularly in those belonging to the lower socioeconomic strata and those who are illiterate with poor knowledge about proper eye care [8,9]. In the literature findings mycotic keratitis is more common in the tropics and sub-tropical regions, and the major precipitating. Factor is trauma, followed by prior application [10].

In the present study the rate of detection of bacterial and fungal (49.21%) and (50.59%), infection caused by the various risk factors viz. Vegetative matter was 18.82%, Stone (22.35%), stick (14.11%), insects (9.41%), grass (11.76%) and animal tail (3.52%) which is comparable with Srinivasan., *et al*. and Basak., *et al*. The higher incidence of fungal causation (50.59%) was seen similar findings reported in Indian context by Bharathi., *et al*. (34.4%) and Ghana study by Leek., *et al*. (37.6%) has shown lesser incidence whereas Geethakumari., *et al*. (69.78%) has reported a much higher incidence of fungal corneal ulcer. It may be due to hot and humid climate of this region. Another reason may be because this study was conducted at a tertiary care centre so fungal ulcers reported are more due to their prolonged course and poor response to available topical medications [11-16]. Ocular trauma 68.3% was the most common predisposing factor followed by topical steroids (19.23%) and diabetes mellitus (7.69%). Assudani HJ., *et al*. (trau-

ma 44.45%, diabetes mellitus 29.5%, contact lens wearers 14.82% and steroid 3.70%) and Kumar., *et al*. where ocular trauma constituted 78.5% of the cases were correlated.

With regards to age in our study, majority of patients (31.76%) were of 41 - 50 years of age group with mean age was 51.21 years. Lapsina., *et al*. reported similar findings he also reported on basis of microbiological analysis (55.8%) of patients were showed fungus and most common was *Aspergillus fumigatus*. Chander., *et al*. did a study in Northern India also concluded same but in study by Srinivasan., *et al*. most common isolates was *Streptococcus pneumoniae*, Coagulase negative *Staphylococcus* was most common in Lapsina., *et al*. and *Pseudomonas* was in Leck., *et al*. The reason for variation could be explained probably due to different climate conditions, socio-economic standards, culture and occupations that are seen in these geographical areas.

In global studies reported by WHO, the Cataract and corneal diseases are major causes of blindness in countries with less developed economies. According to World Health Organization (WHO) corneal diseases are among the major cause of vision loss and blindness in world today after cataract and glaucoma [17-20,31]. With the worldwide decrease in trachoma and other traditional causes of blindness, such as onchocerciasis and leprosy, the World Health Organization has recognized that microbial keratitis is emerging as an important cause of visual disability [7]. By extrapolation of Indian estimates of the incidence of corneal ulcer, approximately 1.5 - 2 million people develop corneal ulcer annually in our country. In our study males had higher incidence of corneal ulcer (61.18%) than females. This is in conformity with the several studies conducted elsewhere like Srinivasan., *et al*. and Bashir., *et al*. This could be explained by fact that they are more involved in outdoor activities hence exposed to unfavorable circumstances like trauma due to vegetative matter in farmers and agriculture workers and leading to corneal ulcer. In study by Upadhyaye., *et al*. males and females were found to be equally affected population.

Katara RS., *et al*. reported that (62%) injury was caused by sugarcane and paddy leaf predominates as they were the principal agricultural products in this region and majority of the farming community are engaged in these two crops. Sugarcane leaf because of its length can easily injure the eye during harvesting of crop. In his study, the clinical features redness was expressed (81.25%), blurred/diminished vision (81.25%), pain (68.7%), irregular feathery margins (75%) was most commonly seen in fungal keratitis. Pain (87.5%), redness (87.5%), lacrimation (62.5%), hypopyon (37.5%) was most commonly seen in bacterial keratitis. In our study hypopyon was 100% associated. This was comparable with Ibrahim., *et al*. Red eye - Bacterial (89.22%). fungal (87%), Pain - Bacterial (90.32%), Fungal (87.55%), Photophobia - Bacterial (67.74%), Fungal (86.67%), Poor vision - Bacterial (71.67%), Fungal (93.49%), Hypopyon - Bacterial (36%), Fungal (16%) and Thomas., *et al*. also he reported similar results Serrated margins-fungal (79%), bacterial (48%), Hypopyon- fungal (48%), bacterial (65%), dry texture- fungal (44%), bacterial (28%). Further, Fungal aetiology is mostly presumed with hyphal pattern, serrated margins, raised slough, dry textured slough, and satellite lesions. In contrast, bacterial aetiology is suspected when symptoms are more prominent. It is marked by clinical features i.e. flat, dry slough, margins well defined, hypopyon, keratic precipitates, flare or cells in the anterior chamber (AC) and deep lesions, but the practical experience in treating cases of fungal keratitis shows that the clinical features do not always correlate with the textbook description. Certain clinical characteristics of corneal ulcers may suggest a specific pathogen, but a reliable diagnosis cannot be made by clinical appearance alone and microbiological investigations should be performed [26-29]. In microorganism culture intervention of fungal ulcer was dealt with identification of different organism stained by culture media asper the SOP in our study we have noticed *Aspergillus flavus* 8 cases were seen; *Aspergillus fumigatus* (11); *Bacillus* species (14); *Fusarium* (23); *Staph aureus* (11); *Strep. epidermidis* (13); *Strep. pneumococcus* (5) cases were seen in association with trauma (77.64%) and diabetes (12.94) were found to be significantly correlated which is comparable to Keshav., *et al*. study he reported that Staphylococcus aureus (68.75%) was the predominant isolate among the Gram positive bacterial. This observation is comparable to studies by Kaliamurthy., *et al*. (2013) (64.5%) and Tiwari., *et al*. (2012) (60%). *Staphylococcus aureus* and *S. epidermidis* form the commensal of extraocular surfaces and invade corneal tissues when compromised by antimicrobial and/or corticosteroid therapy or trauma, and also his study revealed *Pseudomonas aeruginosa* (54.54%) as the most isolated organism among the Gram negative bacterial causes which is in accordance with that reported by Sirikul., *et al*. (2008) and Keshav., *et al*. (2008) he describes *Aspergillus* species (43.39%) was the most prevalent pathogen in the present study as the cause of fungal keratitis. This was comparable to Chander J., *et al*. (1993) and Kaur P., *et al*. (2011) which showed *Aspergillus* spp. as the most common isolate with 41.8% and 50% respectively. Predominance of *Aspergillus* species may be explained by differences in climate and the natural environment. Moulds with enteroblastic conidia adhering in dry chains as in *Aspergillus* spp. were more frequently isolated from patients in the north of the country where the environment usually drier and dustier, than in more humid south. Also, the spores of *Aspergillus* spp. can tolerate hot, dry weather conditions. one more study reported by Northern

part of India in the district of Haryana, this region is being an agriculture land, farming induced trauma is very common. Corneal trauma was the most frequent predisposing factor of suppurative corneal ulcer in the present study (56.11%) unlike results of Western countries where contact lens wear was the chief predisposing factor as seen by Frederic., *et al*. (2001) and Sirikul., *et al*. (2008). Low occurrence of Contact lens induced corneal ulcers in his study may be due to the fact that the majority of the patients were from rural background where use of contact lens is rare. The fungal etiology (81.48%) was most commonly associated with ocular trauma in the present study. The reason behind it may be, as fungi are soil saprophytes and plant pathogens as a result linked to agricultural workers. Furthermore, south Indian climate favors the growth of these fungi.

Similar objectives was proved by Sirikul., *et al*. he describes the frequency of ocular trauma due to vegetative origin was predominant (74.07%) than foreign body. Fungal keratitis was mainly caused by trauma due to vegetable origin (91.06%) and sugarcane leaf accounted for 23.8% of the cases. This is in accordance with Chander., *et al*. (1993) and Sanjeev H., *et al*. (2012). Injury with sugarcane leaf predominates as it is the principal agricultural product in this region and the height of sugarcane plant reaches the average level of the human eye. In bacterial corneal ulcers, toxins produced by the bacteria diffuse through the cornea into the anterior chamber exerting an irritative effect. Pain occurs due to the exposure of the terminal fibres of the ophthalmic division of the trigeminal nerve. In the present study, pain (87.5%), redness (87.5%), lacrimation (62.5%), hypopyon (37.5%) was the main clinical feature noted in bacterial keratitis. Fungal ulcers are characterized by a relatively indolent course. Symptoms are much milder than the signs. The hypopyon is thick and immobile, and it is due to invasion into the anterior chamber of fungal hyphae enmeshed in thick exudates.

Meena., *et al*. reported that fungi are OIS in the eye, since they rarely infect healthy, intact ocular tissues. Even the trivial trauma of the dust particles falling on the cornea may disrupt the integrity of the corneal epithelium, predisposing to laterality and causation factors. In compromised immunosuppressed individuals, serious sight threatening and life-threatening infections caused at larger extent. Moreover, due to illiteracy, patients keep on using eye drops continuously for longer periods, many times even without prescriptions. In our study laterality involvement of RE and LE was significantly associated with trauma it was due to vegetable matter which is most common nature of trauma, followed by animal hair, foreign body, self-inflicted which is similar to study done by Sharma., *et al*. Trauma vegetable origin was (75%), sugarcane leaf and paddy leaf accounted for 50% and 16.60% of the cases respectively. The use of traditional eye medicines (e.g. dried plant materials crushed into powder and dissolved in an aqueous medium; animal/human products such as breast milk, saliva, urine, etc.) is an important risk factor for corneal ulceration in many developing countries. The use of traditional eye medicines is a public health problem in many developing countries, including India, and an important risk factor for corneal blindness. The traditional eye medicines are often contaminated and usually lead to delay in proper therapy. They also serve as a vehicle or culture media for spread and growth of pathogenic organisms.

Conclusion

The major aetiological agent in our study is (*Fusarium* sps. followed by *Bacillus* species) and majority of patients belongs to middle age group (41 - 50 years of age group) of life and from rural areas. Young patients and those presented earlier responded well in comparison to old age patients and those presented late. Corneal ulcer will continues to be important cause of ocular morbidity mostly in the person inhabiting rural areas involved in outdoor agriculture and allied activities. Majority of the young male population was severely affected (> incidence) in these circumstances are often the bread earners of their family and blindness in them cause great economical burden in community. Therefore, we concluded that early screening and inception of therapy could remarkable reduce the incidence rate of corneal ulcer in the rural set up. Further, the clinical presentations of bacterial and fungal corneal ulcers are often described well. The definitive diagnosis of ulcers caused by multiple organisms can only be arrived at by microbiological evaluation. Accurate diagnostic tests not only play a key role in patient management but also reduce the risk of the patient developing long-term complications.

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