Etiological Analysis And Clinical Evaluation Of Chronic Ocular Irritation

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PURPOSE: Etiological analysis and clinical evaluation of chronic ocular irritation and to determine correlation of dry eye with other causes.

MATERIAL AND METHODS: The study was conducted on 500 cases visiting eye department with presenting complaint of chronic ocular irritation. Patients have undergone McMonnies Dry Eye Questionnaire [1, 2], detailed slit lamp biomicroscopy examination, evaluation of blinking rate (BR), tear break up time (TBUT) Schirmer's test I, Staining with fluorescein, lissamine green and rose bengal stain. Staining pattern was graded as per Oxford grading scale[4] and Modified VanBijsterveld conjunctival grading map[5].

RESULTS: Higher prevalence of chronic ocular irritation was seen in middle and older age group and rural population. Prevalence of chronic ocular irritation was observed highest in allergic conjunctivitis (30.40%) followed by dry eye (20.60%). Most common disease associated with dry eye in our study was found to be meibomitis (57.14%), followed by pterygium (51.00%), blepharitis (35.85%). [X^2 = 18.675 DF= 5, P< 0.05]. There was a statistically significant difference in rural and urban distribution of Pterygium, vernal keratoconjunctivitis(VKC) and computer vision syndrome amongst patients complaining of chronic ocular irritation(P <0.001). Staining with lissamine and rose bengal stain method (sensitivity-94.14%) were superior than Schirmer's test1(sensitivity-90.62%) and tear film breakup time (TBUT) sensitivity-82.81% in establishing dry eye diseases as cause of chronic ocular irritation.

CONCLUSIONS: Our study shows that Staining methods with lissamine and rose bengal dyes are more helpful in diagnosis and assessment of dry eye disorder associated with chronic ocular irritation than Schirmer's test and TBUT. Most common disease associated with dry eye in our study was found to be meibomitis. There is a need to increase awareness amongst rural population regarding causative elements of pterygium and vernal keratoconjunctivitis which have higher prevalence in rural population

Introduction

Chronic ocular irritation is an extremely distressing situation both for patients and ophthalmologists .It can be caused by a group of conditions and diseases, but most often it is non-specific in nature. Often tear film abnormality leading to dry eye syndrome is a common cause but frequently associated other common causes responsible for chronic ocular irritation are meibomitis, blepharitis, chalazion, pterygium, allergic conjunctivitis, vernal keratoconjunctivitis, computer vision Syndrome, contact lens use, prolonged topical medication etc. Early identification of causative factors for chronic ocular irritation of eyes is essential for proper management of patients and prevents serious ocular morbidity

Material and Methods.

The study was approved by institutional ethics committee of Mahatma Gandhi University of Medical Sciences and Technology.

The study was conducted on 500 outdoor cases visiting ophthalmology department with presenting chief complaint of chronic ocular irritation during the period from 1 January 2012 to 31 December 2012. Patients underwent a comprehensive medical and ophthalmic history. All patients had undergone hematological workup, blood sugar, complete urine analysis and if desired essential investigations for autoimmune disorders including antinuclear antibody, rheumatoid factor test. Patients on prolonged topical drugs, infected eyes, foreign body and injury, recent surgery, entropion, trichiasis and dystichiasis, glaucoma, uveitis, primary corneal pathology, contact lens users, inflammatory lacrimal sac conditions, extremes of age, uncooperative patients, and children below 5 years of age were excluded.Patients underwent a comprehensive medical and ophthalmic history and examination. McMonnies Dry Eye Questionnaire[1, 2] were used for subjective assessment of chronic ocular irritation.

Objective Assessment.

Assessment of the lids, lashes, conjunctiva and cornea was done using slit lamp biomicroscopy.

Blinking Rate: Number of blinks in one minute was counted with the help of stopwatch.

TBUT (Tear film break up time).

Noninvasive Test.

Reflected mires of keratometer [Bausch & lomb keratometer] were used for Non-invasive tear film stability measurement. Time between the blink and the first sign of a distortion or disruption of the mires was noted with the help of stop watch. An average of at least three values was recorded for each eye.

Invasive Test

We used fluorescein dye strip and the time interval was measured between a complete blink to the first appearance of a dry spot in the precorneal tear film with the help of stop watch as described by Norn and revised by Lemp MA Holly[3]

Schirmer I Test

It was done without anaesthesia, using Whatman filter paper 41and schirmer strips were placed at the junction of the middle and lateral third of the lower eyelid.

Ocular Surface [Diagnostic Dye Evaluation]

Corneal and conjunctival cellular damage was determined using various staining agents. Fluorescein, viewed with a barrier filter, highlighted epithelial cell loss, while rose bengal or lissamine green highlighted epithelial surfaces that had been deprived of mucin protein protection or which had exposed epithelial cell membranes.

The severity of staining was scored according to oxford grading scale[4]. Fluorescein showed characteristic diffuse sub epithelial or punctuate staining. Rose bengal and lissamine green dyes were used for Van Bijsterveld grading scale[5] that divides the ocular surface into three zones: nasal bulbar conjunctiva, cornea, and temporal bulbar conjunctiva.

Results

Prevalence of chronic ocular irritation was more in young and middle aged males and old females. Male to female ratio was 0.96:1. [F = 16.67/1821 = 0.01, P = 0.928, F=0.01 P=0.928, X^2= 31.378 DF=4 , P= 0.0] - Table1.

Table.1 Age and Sex distribution of chronic ocular irritation

Age Group	Male N [%]	Female N [%]
0-29	**80[32.65%]**	**58[22.74%]**
30-59	**113[46.12 %]**	**145[56.86%]**
>60	**52[21.22%]**	**52[20.39%]**
Total	**245**	**255**

Between SS 16.67 DF 1 MS 16.67 Within SS 7283 DF 4 MS 18.21 Total 7299 5 F = 16.67/1821 = 0.01, P = 0.928 F=0.01 P=0.928 X^2= 31.378 DF=4 , P= 0.0

Female preponderance was seen in dry eye, blepharitis, meibomitis and allergic conjunctivitis. Male preponderance was seen in VKC and computer vision syndrome Table2.

Table-2 Gender distribution of various aetiological factors producing chronic ocular irritation.

Etiology	Male		Female	
	N= 245	%	N= 255	%
Dry eye	46	9.20	57	11.40
Blepharitis	23	4.60	30	6.0
Meibomitis	29	5.80	34	6.80
Chalazion	16	3.20	9	1.80
Pterygium	14	2.80	21	4.20
Allergic conjunctivitis	71	14.20	81	16.20
VKC	22	4.40	10	2.0
Computer vision syndrome	24	4.80	13	2.60

Overall prevalence of Allergic Conjunctivitis was highest (30.74 rural and 30.04% urban) among all other etiologies of chronic ocular irritation.

The rural and urban distribution of pterygium, vernal keratoconjunctivitis and computer vision syndrome was statistically significant (P<0.001 # SEP 0.4103 Z 13.576 P<0.001, ## SEP 0.0429 Z 10.266 P<0.001, ### SEP 0.0234 Z 3.937)

Table3.

Table-3 Rural & urban distribution of etiological factors		
Etiology	**Rural N=257 [%]**	**Urban N=243[%]**
Dry eye	47 [18.29%]	56 [23.04%]
Blepharitis	27 [10.50%]	26 [10.70%]
Meibomitis	35 [13.62%]	28 [11.52%]
Chalazion	15 [5.84%]	10 [4.11%]
#Pterygium	25 [9.73%]	10 [4.11%]
Allergic Conjunctivitis	79 [30.74%]	73 [30.04%]
##VKC	22 [8.56%]	10 [4.11%]
###Computer vision syndrome	7 [2.72%]	30 [12.35%]
# SEP 0.4103 Z 13.576 P<0.001## SEP 0.0429 Z 10.266 P<0.001 ### SEP 0.0234 Z 3.937 P<0.001		

Association of symptom of dryness of eyes with meibomitis was highest followed by pterygium, blepharitis, allergic conjunctivitis, chalazion, VKC and which was highly significant in our study. [X^2 = 18.675 DF= 5, P< 0.05] -Table4.

Table-4 Association of symptoms of dryness of eyes with other ocular surface diseases			
Etiological factors	Total cases	Cases of Dry eye symptoms Yes	Cases of Dry eye symptoms NO
Allergic Conjunctivitis	152	34[22.36%]	118[77.64%]
Blepharitis	53	19[35.85%]	34[64.15%]
Meibomitis	63	36[57.14%]	27[36.86%]
Chalazion	25	5[20.00%]	20[80.00%]
Vernal keratoconjuntivitis	32	4[12.50%]	28[87.50%]
Pterygium	35	18[51.40%]	17[49.60%]
X^2= 18.675 DF= 5, P< 0.05			

TBUT mildly reduced in 51(24 %) cases, moderately reduced in 67(31.6 %) cases and severely reduced in 94(44.33%) cases. Schirmer's test mildly to moderately reduced in94 (40.51%) cases and severely reduced in138 (59.48. %) cases - Table5.

There were 72 cases diagnosed as grade-I Oxford scale but Schirmer's test reading below 10mm/5minute wetting was observed only in 63 cases. Cases of grade-II toV Oxford grading scale with

Staining represented dry eye similar to Schirmer's test I as shown in figure-1.

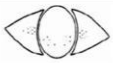
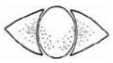
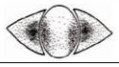
	PANEL	GRADE	VERBAL DESCRIPTOR	N [Cases]	Schirmer's reading<10mm/5 min.
A		0	Absent	15	0
B		I	Minimal	72	63
C		II	Mild	61	61
D		III	Moderate	49	49
E		IV	Marked	35	35
>E		V	Severe	24	24

Figure-1 Results of Oxford grading scale in cases of chronic ocular irritation with impaired Schirmer`s test-I

Staining method with lissamine and rose bengal is more sensitive diagnostic method than Schirmer's test and TBUT. [Sensitivity of staining methods = 94.14%, Sensitivity of Schirmer's test = 90.62%, Sensitivity of TBUT. =

82.81%] Table6.

Table -6 Sensitivity of various tests in assessment of eyes with chronic ocular irritation.			
Procedure		No. of cases with impaired test values	Sensitivity[%]
Blinking rate	Increased [>12/ Minute]	204	79.69%
TBUT	Decreased [<15 seconds]	212	82.81%
Schirmer test-I	Decreased [<10mm]	232	90.62%
Lissamine and Rose bengal staininig	Positive stain	241	94.14%

Staining method with lissamine green and rose bengal is more sensitive diagnostic test than Schirmer test-I, TBUT, blinking rate

Discussion

Chronic irritation of eyes derives its importance because it can be caused by a group of conditions and diseases. It is an extremely distressing situation both for patients and doctors. It may be the only symptom of many ocular surface diseases including dry eye syndrome.

In this study both sexes were equally symptomatic as regards complaint of ocular irritation, the male to female ratio being 0.96:1. However, it was observed that in age group 30-59 there was clear female preponderance. This could be explained by the fact that some diseases which are causative factors for chronic ocular irritation [e.g. dry eye] are more common in females particularly in the above mentioned age group and there was male predominance in 0-29 years age group in our study and this tendency can be explained partly because in this age group male computer working population is more and also the fact that males exceed females in the total population. Both sexes tend to develop chronic ocular irritation in the late age of their life presumably because there are more chances of developing tear film instability and inadequacy. No age was found to be immune for chronic ocular irritation but it showed increasing trend with age. Female preponderance was seen in dry eye, blepharitis, meibomitis and allergic conjunctivitis. Male preponderance was seen in VKC and computer vision syndrome. The urban and rural distribution of pterygium, VKC and computer vision syndrome were statistically significant (P<0.001).

In the present study the most common cause of chronic ocular irritation was allergic conjunctivitis 152cases (30.40%) followed by dry eye 103cases (20.60%), a higher prevalence than reports of 20% of ocular allergy in the general population by Bonini ET al[6]. In our study VKC male to female ratio was 2.2:1which is similar to reports of Buckley [7].

We found staining with Lissamine and Rose Bengal superior(sensitivity-94.14%) in identifying cases of dry eye leading to symptoms of chronic ocular irritation than Schirmer's test(sensitivity-90.62%) and TBUT(Sensitivity-82.81%). This could be because the quantity of tear production is decreased with advancing age as measured by Schirmer's values by Milder[8].

The most common condition causing dry eye in our study was found to be Meibomitis with 36 out of 63[57.14%] patients of Meibomitis diagnosed as dry eye patients [X^2 = 18.675 DF= 5 , P< 0.05] much higher prevalence than reports of 25% cases of dry eye by Mc culley et al[9] . However, Mather WD[10] showed the frequency of dry eyes to be as high as 56% in patients with blepharitis.

Our study shows significant demographic data as regards age, sex, rural and urban distribution of various aetiological factors leading to chronic ocular irritation and objective value of not only tear film assessment but also ocular surface staining by rose bengal and lissamine green.

Conclusion

Our study shows that chronic ocular irritation is a significant reason for presentation of the patient to the ophthalmology OPD. Proper and timely identification of the causative factor by the ophthalmologist through proper history taking and appropriate clinical evaluation helps in diagnosing the underlying disease and carrying out the patient's disease management. There is also a need to increase awareness amongst rural population regarding causative elements of Pterygium and vernal keratoconjunctivitis which have higher prevalence in rural population. Staining methods with Lissamine and Rose Bengal dyes are more helpful in diagnosing and assessment of dry eye disorder associated

Disclosure

The authors have no proprietary or financial interest in the instruments or dyes mentioned in the article

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