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Original Article

A study on meibomian gland disorders and lipid levels in north Indian population

Dr. Mohd Mobin[1], Dr. Pooja Kanodia[2] ,Dr. Rubie Malhotra[3], Dr. Anurag Kumar Singh[4]

[1]Associate Professor,Department of Ophthalmology, IIMS & R, Lucknow
[2]Assistant Professor,Department of Ophthalmology, IIMS & R, Lucknow
[3]Professor,Department of Ophthalmology, IIMS & R, Lucknow
[4]Senior Consultant, Ram Krishna Sevasram, Mirzapur

Corresponding author: DR. Pooja Kanodia
Department of Ophthalmology,IIMS & R, Lucknow

Abstract

Objective: To study meibomian gland disorders (MGD) and lipid levels in north Indian population.

Methods: This was a cross-sectional study. A total of 100 clinically diagnosed cases of MGD were included in the study. A detailed history using a Symptom Assessment in Dry Eye (SANDE) questionnaires was taken. Thorough clinical examination using Slit Lamp was performed to confirm the diagnosis of dry eye and for the probable etiology. For this, standard tests like Tear Film break-up time [TFBUT], Schirmer's test, Phenol Red Thread test were employed. Patients found to have dry eye were evaluated further by slit-lamp biomicroscopy of the lid margins for posterior blepharitis and the degree of meibomian gland dysfunction, if any, was graded. After a complete ocular examination, they were allotted into the groups. Laboratory investigation that was performed in each patient included Serum Fasting Lipid Profile.

Results: More than half (59%) of patients were above 45 years of age and 57% were males.Grade II severity of meibomitis was in more than one third of the cases (46%) followed by grade I (42%) and grade III (12%).Borderline cholesterol was in 55% of the cases who had grade II severity of meibomitis. High cholesterol level was found the 50% patients of grade III severity of meibomitis. However, this association was statistically insignificant ($p>0.05$). High TG was seen 53.5% and 30.2% of grade II and grade III severity of meibomitis. The association between TG level and severity of meibomitis was found to be statistically significant ($p=0.0001$). There was no significant ($p>0.05$) association of serum HDL level with severity of meibomitis. However, serum LDL level was found to be significantly ($p=0.008$) associated with severity of meibomitis.

Conclusions: Patients with MGD with history of dyslipidemia may have undiscovered abnormal serum cholesterol, triglycerides and LDL levels.

Key words: Meibomian gland disorders, Lipid levels,Dyslipidemia

INTRODUCTION

Meibomian gland secretion is lipid in nature, so it is only logical to search for a possible link between systemic lipid level abnormalities and meibomian lipids. Indeed, as the pathogenic mechanism of Meibomian gland dysfunction (MGD) is being understood, studies have been designed in various parts of the world to detect any correlation between blood lipids and MGD (Jacob et al, 2016).

Meibomian gland dysfunction is more often seen in women and is regarded as the main cause of dry eye disease.Factors that contribute to meibomian gland dysfunction can include things such as a person's age and/or hormones. Treatment can include warm compresses or expression of the gland and in some cases antibiotics or steroids are prescribed (Kumar et al, 2016).

With a number of changes in lifestyle involving dietary preferences, work habits and the advent of computer usage in all spheres of life, the incidence and prevalence of dry eye has increased dramatically in the general population. Meibomian gland dysfunction (MGD) is a major cause of dry eye, but is often overlooked in busy out-patient settings. Meibomian glands contribute to the lipid component of the tear film, and their normal secretion prevents premature evaporation of tears from the ocular surface (Kumar et al, 2016).

The lipid layer is an essential component of the tear film, which maintains a smooth corneal surface and controls the evaporation rate from the eye (Bron et al, 2004). The tear film lipid layer is composed chiefly of the meibomian glands, which are tubuloacinarholocrine glands that discharge their entire contents during the secretion process (Butovich, 2011).

Chemical analysis of lipids secreted from normal meibomian glands shows that it consists of a mixture of non-polar lipids (wax esters, cholesterol, and cholesterol esters) and polar lipids (phospholipids and glycolipids) (Nicolaides, 1965). Systemic dyslipidemia, a disorder of lipid metabolism, may theoretically affect the meibomian lipid composition.

The present study was conducted to study the association of meibomian gland disorders and lipid levels in north Indian population.

MATERIAL AND METHODS

This was a cross-sectional study conducted in a tertiary care hospital in north India. The study was approved for ethical considerations by the Institutional Ethical Committee. Consent from each subject was taken before including in the study. A total of 100 clinically diagnosed cases of MGD were included in the study. The cases having previous history of any confounding ocular diseases (leprosy, entropion, ectropion, lid malignancies), patients on medical therapy affecting lipid profile (lipid lowering drugs) and patients having heavy smoking habit were excluded from the study. A detailed clinical history was noted for each patient.

A detailed history using a Symptom Assessment in Dry Eye (SANDE) questionnaires was taken. Thorough clinical examination using Slit Lamp was performed to confirm the diagnosis of dry eye and for the probable etiology. For this, standard tests like Tear Film break-up time [TFBUT], Schirmer's test, Phenol Red Thread test were employed. Patients found to have dry eye were evaluated further by slit-lamp biomicroscopy of the lid margins for posterior blepharitis and the degree of meibomian gland dysfunction, if any, was graded. After a complete ocular examination, they were allotted into the groups. Laboratory investigation that was performed in each patient included Serum Fasting Lipid Profile.

Statistical analysis

The results are presented in frequencies and percentages. The Chi-square test was used to assess the associations. The p-value<0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

RESULTS : In the present study; 59% of patients were above 45 years followed by 31-45 (32%) and 15-30 (9%) years. More than half of patients were males (57%) (Table-1).

Table-1: Age and gender distribution of meibomitis cases

Age and sex	No. (n=100)	
Age in years		
15-30	9	9.0
31-45	32	32.0
>45	59	59.0
Gender		
Male	57	57.0
Female	43	43.0

Grade II severity of meibomitis was present in more than one third of the cases (46%) followed by grade I (42%) and grade III (12%) (Table-2).

Table-2: Severity of meibomitis cases

Severity	No. (n=100)	%
Grade I	42	42.0
Grade II	46	46.0
Grade III	12	12.0

Desirable cholesterol level was in found in majority of the cases (76%) followed by borderline (20%) and high level (4%). Borderline TG was found in 52% of the cases and high TG was observed in 43% of the cases. Borderline HDL was in more than half of the cases (55%) and desirable HDL level was in 43% of the cases. Desirable LDL was in 51% of the cases and borderline LDL level was in 42% of the cases (Table-3)

Table-3: Lipid profile of meibomitis cases

Lipid profile	No. (n=100)	%
Serum cholesterol (mg/dl)		
Desirable (<200)	76	76.0
Borderline (200-239)	20	20.0
High (≥240)	4	4.0
Serum TG (mg/dl)		
Desirable (<150)	5	5.0
Borderline (150-199)	52	52.0
High (≥200)	43	43.0
Serum HDL (mg/dl)		
Desirable (<40)	43	43.0
Borderline (40-60)	55	55.0
High (≥60)	2	2.0
Serum LDL (mg/dl)		
Desirable (<100)	51	51.0
Borderline (100-129)	42	42.0
High (≥130)	7	7.0

Table-4: Association of lipid profile with severity of meibomitis cases

Lipid profile	No. of cases	Severity of meibomitis						p-value[1]
		Grade I		Grade II		Grade III		
		No.	%	No.	%	No.	%	
Serum cholesterol (mg/dl)								
Desirable (<200)	76	33	43.4	35	46.1	8	10.5	0.06
Borderline (200-239)	20	4	20.0	11	55.0	5	25.0	
High (≥240)	4	1	25.0	1	25.0	2	50.0	
Serum TG (mg/dl)								
Desirable (<150)	5	4	80.0	1	20.0	0	0.0	0.0001*
Borderline (150-199)	52	27	51.9	23	44.2	2	3.8	
High (≥200)	43	7	16.3	23	53.5	13	30.2	
Serum HDL (mg/dl)								

Desirable (<40)	43	15	34.9	24	55.8	4	9.3	0.25
Borderline (40-60)	55	23	41.8	22	40.0	10	18.2	
High (≥60)	2	0	0.0	1	50.0	1	50.0	
Serum LDL (mg/dl)								
Desirable (<100)	51	27	52.9	20	39.2	4	7.8	0.008*
Borderline (100-129)	42	10	23.8	24	57.1	8	19.0	
High (≥130)	7	1	14.3	3	42.9	3	42.9	

[1]Chi-square test

Table-4 shows the association of lipid profile with severity of meibomitis cases. Borderline cholesterol level was present in 55% of the cases having grade II severity of meibomitis. High cholesterol level was found in 50% patients of grade III severity of meibomitis. However, this association was statistically insignificant (p>0.05). High TG was seen 53.5% and 30.2% of grade II and grade III severity of meibomitis. The association between TG level and severity of meibomitis was found to be statistically significant (p=0.0001). There was no significant (p>0.05) association of serum HDL level with severity of meibomitis. However, serum LDL level was found to be significantly (p=0.008) associated with severity of meibomitis.

DISCUSSION

Meibomian gland dysfunction (MGD) is a common chronic condition, affecting millions worldwide, and is one of the most frequent pathologies observed on a daily basis by eye specialists throughout the world. In the last decade,Nichols et al (2011) stated that MGD had become recognized as the major cause of evaporative dry eye. The scientific literature reports wide variations in the prevalence of MGD, with published rates ranging from as low as 3.5% to close to 70% in clinical and population-based studies (Jie et al, 2009).

In the present study, more than half (59%) of patients were above 45 years followed by 31-45 (32%) and 15-30 (9%) years. More than half of patients were males (57%). In a study (Kumar et al, 20165), the majority were in the age group of 41-70 yrs of age (59 %). Patients suffering from MGD in this age group were 35 (59.32%), more than age group of 20-40 yrs. Sullivan et al (2006) also showed significant alterations in older versus younger individuals' polar and neutral lipid profiles derived from meibomian gland secretions by high-performance liquid chromatography or mass spectrometry.

In the present study, grade II severity of meibomitis was most common (46%) as compared to a study by Amal et al which reported severe meibomitis in 59.5% of the cases (Amal, 2009).

In the present study, borderline cholesterol was present in 55% of the cases having grade II severity of meibomitis. In patients with high cholesterol level, 50% had grade III severity of meibomitis whereas 25% of cases had grade I and grade II respectively . The association between TG level and severity of meibomitis was found to be statistically significant (p=0.0001). There was no significant (p>0.05) association of serum HDL level with severity of meibomitis. However, serum LDL level was found to be significantly (p=0.008) associated with severity of meibomitis. In a study (Kumar et al, 2016), out of 50 MGD cases, 47 patients had altered total cholesterol (TCH) as compared to 8 patients in Non MGD controls.

CONCLUSIONS

Patients with MGD with history of dyslipidemia may have undiscovered abnormal serum cholesterol, triglycerides and LDL levels. The presence of MGD might have a correlation with dyslipidemia and the prevalence of high total cholesterol, triglyceride and low-density lipoprotein levels may be taken as a risk factor for increasing severity of MGD. Thus the present study highlights the significance of monitoring serum fasting lipid levels due to its potential correlation with the progression of MGD.

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