



Meibomian Gland Dysfunction: Impact Study of Dyslipidaemia and Role of Ophthalmologists in Its Diagnosis

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ABSTRACT

In present study, the relation between severity of meibomian gland dysfunction and serum lipid profile is determined. All of the eligible patients were assessed for their meibomian gland dysfunction status on the basis of expressibility and secretion of meibomian glands and by differentiating lid margin features by performing slit lamp examination, Schirmer's test, Tear film breakup time, tear meniscus height, dry eye severity grading done, assessing levels of total cholesterol and other lipid parameters and also evaluating the blood sugar and HbA1c levels. In the present study, it was observed that meibomian gland disease was commonly found in the study group and was majorly seen in males (55%) of 25-30 yrs (36%) age group amongst which raised serum cholesterol (46%) contributed the most in increased meibomian gland dysfunction of the total study population of 198 patients. Meibomian gland dysfunction severity is a crucial marker to assess the serum lipid profile. Thus ophthalmologist plays a very important role in diagnosing underlying systemic disease by ruling out deranged lipid parameters related to meibomian gland dysfunction and further help the patients to prevent cardiovascular diseases.

Keywords: Meibomian gland, Meibomian gland dysfunction, serum lipid profile.

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INTRODUCTION

Dry eye disease (DED) effects all ages and has a great impact on the health sector, as it effects the quality of life, therefore it makes a major part of ocular surface diseases. Beaver Dam Offspring Study (BOSS) states that the dry eye prevalence is 14.5% which is very high and amongst this 10.5% were men and 17.9% were women [1]. One of the chief causes for the dry eye disease is the Meibomian gland dysfunction which is a part of evaporative dry eye disease. In the recent studies, a notable observation was made that MGD is age related and is seen more in Asian people [2]. Whereas other studies proclaimed it to be in a lesser amount [3-5]. It is seen that increase in the cholesterol level is directly proportional to the increase in the MGD prevalence and dry eye disease [6].

MGD is also associated with increased levels of LDL and HDL in the body. In a study done it was seen that people of the age group 25-50 years with no history of increased cholesterol who had MGD when further when evaluated for blood lipid profile showed increased cholesterol levels [7-8]. On the other hand there were also some researches that showed no relation between MGD and dyslipidemia, but when there was seen increase in LDL level of body, there was increased prevalence of MGD and its severity seen [8]. As it is known that the meibomian gland secretions constitute lipid component, which can be one of reason why dyslipidemia is associated with MGD. In this ophthalmologist plays a very important role in detecting underlying diseases as MGD is related to deranged blood lipid profile which can further help the patient to diagnose or be careful about cardiovascular diseases that can be caused by the abnormal lipid levels.

After reviewing and seeing the differences the goal of the study is to see the link between blood lipid level and MGD intensity in patients having negative dyslipidemia history.

MATERIALS AND METHODS

The present observational study was approved by the university's ethical committee. This study was conducted in the out Patient department and done on 198 clinically diagnosed cases of MGD aging from 25 - 45 yrs. 198 cases will be taken as sample size.

Based on formula $n = z^2/pq$ where $p=14.5\%$ Prevalence [1] (as per previous study), $q=1-p$, $d=0.05$

precision limit corresponding to effect size $n = [(1.96) * (1.96) * 0.145 * 0.86] / [(0.05) * (0.05)] n = 198$
Patients with clinically diagnosed MGD aging from 25-45 years were included in the study.

The following patients were excluded from the study:

- Dry eye diagnosed cases taking treatment.
- Patients taking medications for hypertension and glaucoma.
- Presence of chalazion or trachoma.
- Any chemical injury to eye or any previous ocular surgery cases
- Patients having lid malformation or deformity
- Contact lens wearers
- Vit A deficiency

Informed consent was taken from all the patients.

The observation was done on the basis of clinical history and examination and specific ocular tests. The assessment was based on meibum expressibility grading done under slit lamp examination, tear film breakup time, tear meniscus height, schirmer's test and levels of serum lipid.

Statistical analysis was done using MS excel and SPSS version 24. A P value of less than 0.05 was deliberated to be statistically significant. Slit lamp biomicroscopy was used for diagnosing meibomian gland dysfunction where meibomian glands were expressed and grading were given according to it. The secretion of meibomian gland was evaluated in central third portion of the lower lid on 0-3 grading scale for each of the gland:

Gr 0 : clear discharge, Gr 1 : cloudy discharge

Gr 2 : cloudy discharge, Gr 3 : toothpaste like discharge

Expressibility of meibum is assessed from minimum glands:

Gr 0 = all glands squeezing out meibum;

Gr 1 = 3-4 glands squeezing out meibum;

Gr 2 = 1-2 glands squeezing out meibum

Gr 3 = no gland squeezing out meibum .

This will be evaluated in one of the upper lid or lower lids

Lid margin features were differentiated : for 1. vascularity 2. plugging

3. Displacement 4. Dropout

Dry Eye severity grading scale was put forward by Delphi Panel Report. It is a scheme where patients discomfort, conjunctival congestion and staining, visual symptoms, corneal staining, tear break up time, meibomian gland analyses, shirmers test is taken into account. Four severity levels are given as gradings in this ,starting from mild to very severe with the marking of 1-4 of examination done above grading was done as per Gerling.G et al studies [8].

Stage 1- Mild MGD:

- No symptoms seen of ocular discomfort, itching and photophobia.
- On the basis of gland expression, clinical signs seen for MGD ;
- Quality of meibum changed minimally - Grade 2 to less than.
- Expressibility: 1.
- No ocular surface staining.

Stage 2: Moderate MGD :

- Minimum to mildest form of symptoms consisting of ocular discomfort, photophobia and itching.
- On the basis of gland expression, the clinical signs of MGD as follows;
- Lid margin = scattered.
- Quality of meibum changed mildly -Grade 4 to < 8.
- Expressibility: 1.

Minimal staining of the ocular surface (Gr 0-7 acc to DEWS classification) Stage 3: Severe MGD:

Symptoms like irritation in the eye, glare, phototphobia and itching that limits daily activities.

On the basis of gland expression, clinical signs of MGD are :

- Lid margin features showing - plugging, vascularity.
- Quality of meibum changed moderately :Grade 8 to less than 13.
- Expressibility: 2.

Mild to moderate form of conjunctiva and corneal periphery staining, often at the inferior part (DEWS grade 8-23).

Stage 4: Very severe MGD

Showing marked symptoms that includes ocular discomfort, itching and photophobia with limitations of daily activities.

On the bases of gland expression, clinical signs of MGD are :

- ✦ Lid margin features showing - dropout, displacement.
- ✦ Quality of meibum changed severely - Grade 13. Expressibility: 3.
- Increase in conjunctiva and corneal staining that also includes staining of the central part (DEWS grade 24 to 33)

Signs of inflammation that include - moderate conjunctival congestion, phlyctenules

Other test like tear meniscal height ,tear film breakup time, Schirmer test, lipid profile, Blood sugar were also done to assess the correlation.

RESULT AND DISCUSSION

Out of 198 Patients diagnosed with MGD, 36% of the cases were of age group 25-30 yrs, 22 % were of age group 31-35 years, 18% were of age group 36-40 yrs and 21% were of age group 41-45 yrs.(Figure 1) Out of a total of 198 patients taken in our study, who were diagnosed with meibomian gland dysfunction, 45% were females and 55% were males. (Figure 2).

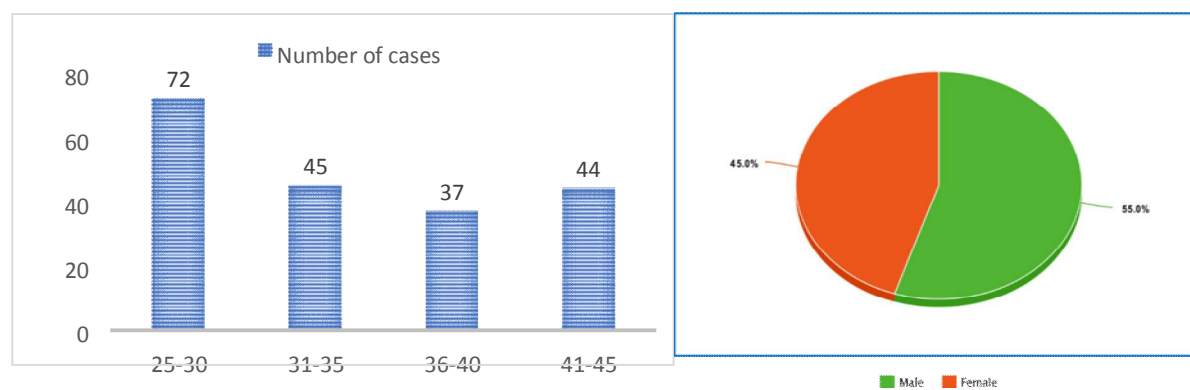


Figure 1: Age wise distribution of MGD

Figure 2: Gender wise distribution of MGD

MGD was seen less in outdoor occupation patients, with it being present only in 61 patients (31%). Amongst them, 21% showed very severe MGD, 31% had severe MGD, 38% had moderate MGD and 10% had mild MGD. It was more in indoor occupation patients i.e 137 in number (69%). Amongst the indoor occupation patients, 18% showed very severe MGD, 31%, showed severe MGD, 31% showed moderate MGD and 14% showed mild MGD. Thus, results were not found to be statistically significant. Among the 198 patients, 10% had diabetes, 15% had hypertension and 8% had both hypertension and diabetes. However, no comorbidity was seen in 66% of the patients that were taken in our study[9-10].

Table 1: CORRELATION BETWEEN MGD SEVERITY AND SERUM LIPID PROFILE

parameter	Very Severe form	Severe form	Moderate form	Mild form	P Value
	Mean value ± SD	Mean value ± SD	Mean value ± SD	Mean value ± SD	
Triglycerides	136.67 ± 14.92	137.90 ± 16.47	131.44 ± 10.75	128.40 ± 7.15	0.001
VLDL	24.15 ± 7.90	25.38 ± 7.95	21.44 ± 5.88	19.28 ± 4.07	<0.001
HDL	43.83 ± 6.23	45.84 ± 6.91	48.37 ± 5.48	51.46 ± 3.74	<0.001
LDL	134.23 ± 8.00	133.00 ± 11.43	123.40 ± 8.75	116.60 ± 7.00	<0.001
Serum Cholesterol	209.07 ± 7.35	206.0 ± 13.86	196.50 ± 10.00	193.40 ± 10.50	<0.001

The fasting serum lipid levels were evaluated in all the 198 patients and the following results were seen. The mean serum triglycerides values evaluated were 136.67± 14.92 in very severe MGD, 137.90±16.47 in severe MGD, 131.44±10.75 in moderate MGD and 128.40±7.15 in mild MGD. The mean serum VLDL values evaluated were 24.15±7.90 in very severe MGD, 25.38±7.95 in severe MGD, 21.44±5.88 in moderate MGD and 19.28±4.07 in mild MGD. The mean serum HDL values evaluated were 43.83±6.23 in very severe MGD, 45.84±6.91 in severe MGD, 48.37±5.48 in moderate MGD and 51.46±3.74 in mild MGD. The mean serum LDL values seen were 134.23±8.00 in very severe MGD, 133.00 ±11.43 in severe MGD, 123.40±8.75 in moderate MGD and 116.60±7.00 in mild MGD. The mean serum cholesterol values seen were 209.07±7.35 in very severe MGD, 206±13.86 in severe MGD, 196.50±10.00 in moderate MGD and 193.40 ±10.50 in mild MGD patients (Table-1). All these results were found to be statistically significant. This study showed a high number of cases in the age group of 25-30 yrs, probably due to the high number

of patients selected for this study from this age group. However it was seen that very severe MGD was most prevalent in the age group of 41-45 yrs. This study came to the conclusion that MGD was related to dyslipidemia, which is characterised by elevated levels of triglycerides and total cholesterol. This is congruent with the research-based conclusions from earlier reports' studies[11-13].

CONCLUSION

It was concluded that increase in lipid parameters specially increase in serum cholesterol contributed in increase in MGD. If deranged lipid profile is diagnosed at early stage, patient could be saved from cardiovascular diseases.

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