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Prevalence of Obstruction Meibomian Gland Disease among Ophthalmology Patients

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Abstract. To report the prevalence of obstructive meibomian gland disease that is among ophthalmology patients in a tertiary care hospital. A prospective interventional study of the prevalence of obstructive meibomian gland disease; 420 patients were recruited with a mean age 34.9 years. Obstructive meibomian gland disease (OMGD) was found in 77.6% (326/420); 56.1% were females (p =. 03). Grade 1 disease occurred in (65.8%) of the patients ≤ 19 years old; grade 2 occurred in 46.4% of patients 50-59 years old; and grade 3 occurred in 59.5% of those ≥ 60 years old (p = .001). Anterior blepharitis was found in 85% (p = .001), giant papillary conjunctivitis in 6.7%, corneal scar in 1.5%, entropion and/or trichiasis in 0.9%. About 77.6% of the patients have OMGD affecting mostly females. Anterior blepharitis was commonly found affecting mainly patients 20-40 years old. Hypothesize of this association at that age group, might play a role in the progression of OMGD, which occurred mainly at the age of 50. Therefore, early detection and treatment of both diseases might prevent the progression to the irreversible meibomian gland loss.

Keywords: Meibomian gland disease, Blepharitis, Giant papillary conjunctivitis, Rosacea.

Introduction

Meibomian glands are modified sebaceous glands located on the lid margin, where acini discharge their entire contents in the process of secretion, which is vital for promoting ocular surface function. Meibomian gland disease (MGD) is a term used to describe changes that occur in the glands. When these changes are accompanied by inflammatory process it is referred to as meibominitis[1].

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MGD can be classified into hypersecretory type; characterized by a release of large volumes of oil at the lid margin in response to expression hyposecretory, which is due to reduced secretory function from the use of toxic agents, like retinoids and obstructive MGD (OMGD). This can be further sub-classified into simple obstructive MGD; when there is hyperkeratinization of the ductal epithelium leading to obstruction of the gland orifices; linked with giant papillary conjunctivitis due to contact lens wear[2]. Plus cicatricial obstructive meibomian gland disease when there is loss of the glands; scarring in lid margin and conjunctiva which is often accompanied by cicatrizing conjunctival diseases[3].

Although meibomian gland disease is seen very frequently among our patients, this is the first study performed in Saudi Arabia.

Material and Methods

All patients who were seen for a routine check in the eye clinic in a tertiary care facility in Jeddah (from August till November 2008) were included in the study, and their use of contact lenses was documented. All underwent a slit lamp examination to evaluate the lid margin for evidence of OMGD. Table 1 shows the grading system used, which was a modification of the system used for clinical trials for OMGD[2].

Table 1. Grading system for OMGD[2].

	Grade 1	Grade 2	Grade 3
Lid margin	-Normal thickness and no visualization - Mild to moderate degree of thickening and vascular engorgement.	Sever thickening, rounding and vascular engorgement	
Gland orifices	Plugged with keratin-type-white colored material	Capped with dome shaped solidified lipid with pouting	Plugged with opaque scar like tissue with narrowing or invisible obliterated orifices
Character of secretion expressed upon digital pressure on the lid margin	Clear	Cloudy	Toothpaste-like or absent even with forceful repeated pressure along the whole lower lid

The presence scales on the eye lashes that signify anterior blepharitis; giant papillary conjunctivitis related to contact lens wear;

entropion; trichiasis; and trachoma. Plus, ocular cicatricial pemphigoid, erythema multiforme and rosacea were also documented.

All diagnosed patients with obstructive meibomian gland disease received treatment in the form of warm compressors; Doxycyclin 50mg twice a day for one month; then once a day for another two months; and preservative free artificial tears. All were seen after one month to evaluate the degree of improvement after which they were given regular three months follow-up appointments to monitor the stability of the disease. Patients were always reminded about the need to use warm compressors on daily basis to help disease stability.

Statistical analysis was preformed with SPSS, Version 11, software (SPSS, Inc). Pearson Chi square tests were performed to test the association between variable. A p value of < 0.05 was considered statistically significant.

Results

420 patients were recruited with a mean age 34.9 years (range 7-84). 248 (59%) of them were females. 326/420 (77.6%) were found to have OMGD. 136 (41.7%) of them had Grade 1 disease, 98 (30.1%) had Grade 2 and 92 (28.2%) had Grade 3. Grade 1 disease occurred in 25/38 (65.8%) of the patients $\leq$ 19-years-old, Grade 2 occurred in 13/28 (46.4%) patients 50-59 years old and Grade 3 occurred in 25/42 (59.5%) $\geq$ 60 years old ($p = .001$). Table 2 shows the prevalence of OMGD in relation to age.

183 (56.1%) of the patients were females and 143 (43.9%) were males ($p =. 03$). Table 3 shows the prevalence of OMGD in relation to gender.

277 (85%) of the patients had associated anterior blepharitis ($p = .001$). Table 4 shows the number of patients who had anterior blepharitis among OMGD patients in relation to age.

Only 3 (6.7%) of the 45 (13.8%) contact lens users had secondary giant papillary conjunctivitis and OMGD ($p = .13$). All of the 10 (2.4%) acne rosacea patients had associated OMGD.

Three (0.9%) patients had entropion and/or trichiasis. None of them had history of trachoma. Five (1.5%) had corneal scar and none had

conjunctival scars or any sign of cicatricial pemphigoid or erythema multiforme.

Table 2. Prevalence of grades of OMGD in relation to age.

	Age in Years						Total	p Value
	7-19	20-29	30-39	40-49	50-59	≥ 60		
Grade 1 (%)	25 (65.8)	50 (54.3)	29 (48.3)	22 (33.3)	6 (21.4)	4 (9.5)	136	.001
Grade 2 (%)	5 (13.2)	27 (29.3)	15 (25)	25 (37.9)	13 (46.4)	13 (31)	98	.001
Grade 3 (%)	8 (21.1)	15 (16.3)	16 (26.7)	19 (28.8)	9 (32.1)	25 (59.5)	92	.001
Total	38	92	60	66	28	42	326	

Table 3. Prevalence of OMGD in relation to gender.

	Males	Females	Total	p Value
Grade 1	62	74	136	.196
Grade 2	43	55	98	.523
Grade 3	38	54	92	.063
Total	143	183	326	.030

Table 4. Relationship of anterior blepharitis to OMGD in different age groups.

	7-19 y n (%)	20-29 y n (%)	30-39 y n (%)	40-49 y n (%)	50-59 y n (%)	≥ 60 y n (%)
Anterior blepharitis among OMGD patients	34(89.5)	87(94.6)	51(85)	53(80.3)	23(82.1)	29(69)
Total	38	92	60	66	28	42
p Value	1.0	.001	.018	.24	.07	.93

Discussion

OMGD is one of the most common disorders encountered in ophthalmic practice. It has a wide range of manifestations and different grading systems based on the changes in the muco-cutaneous junction, orifices, main ducts, and acini as well as expressed secretions[4]. In this study 77.6% of patients visiting the eye clinic for routing check up in a tertiary care center were found to have OMGD. A prevalence rate that was higher than all the other similar reports including Hom *et al.*[5] who reported a prevalence rate of 38.9% with diagnosis based on the presence of cloudy or absent secretions upon glands expression. Ong *et al.*[6]

reported a prevalence rate of 43% based on the presence of greasy, opaque or waxy expressions upon digital pressure on the meibomian glands.

Based on clinical and experimental evidence, the natural history of MGD starts with hyperkeratinization of the duct epithelium leading to duct occlusion. This is seen as pouting or plugging of the gland orifices and production of keratin rich expressed material. This plugging causes damming back of the gland secretions that leads to disuse atrophy of the acini. In the advanced stages periductal scaring occurs, it is seen as an exaggerated opaque ring shaped opacity around the ducts or a focal absorption of the gland orifices that ends in total damage and gland loss [7-11]. It was also found that with increasing age; the meibomian orifices show obliteration pouting and narrowing together with a decrease in the amount of gland secretion, without any increase in its viscosity or opacity of the expressed lipids. This is the marker that differentiates the normal changes that occur with age from MGD[12,13].

In this study, patients who have plugged gland orifices with white colored material and express clear fluid upon digital pressure on their glands were staged as having grade 1. As that indicates the very early changes of hyperkeratinization and stagnation of secretions within the glandular tissue. Detected of stage 1 disease was mainly among those less than 20 years of age, grade 2 disease was found predominantly in patients in the fifth decade while grade 3 disease affected mainly patients at 60 years of age or older. These findings suggest that the disease process might start up gradually very early in life, and then builds up slowly over the years to transform into stage 2. This occurred mostly in the fifth decade of life, when age related changes in the meibomian glands start to develop causing narrowing and ductal obliteration. That can also explains the rapid shift from grade 2 to grade 3 that occurred in a matter of only few years among the patients. Therefore, it's believed that detecting and treating the disease in its early stages, early in life might help in controlling its progression to the more damaging irreversible stage that occurs later in life.

A statistically significant association was found between OMGD and female gender ($p = .03$).

A finding that contradicts other reports that showed no gender predilection[5,14]. Hormonal changes that occur in women and use of

hormonal replacement therapy or oral contraceptive pills are known to play a significant role in the development of MGD. Thus, it needs to be explored in further studies.

Anterior blepharitis is not uncommonly seen in association with MGD due to the abnormal keratinization found mainly with seborrheic blepharitis[16]. However it is still unclear whether the keratinization and gland drop out are primary or secondary phenomena[17]. 85% of the patients with OMGD had associated anterior blepharitis; most of them were between 20-40 years of age. Physicians hypothesize that presence of anterior blepharitis was found mainly between the age of 20 and 40 years. This might has an additive role in the progression of OMGD from grade 1 which was seen mostly in patients less than 20 years old, to grade 2 which was found mainly at the age of 50 years.

Rosacea is usually associated with hypertrophy and plugging of the sebaceous glands without increase in the sebum excretion rate. Borrie *et al.*[18] found that almost 100% of rosacea patients had MGD. The same result was found in this study as 2.4% of all the recruited candidates had acne rosacea and all of them were found to have OMGD.

MGD was found to be one of the most common causes of contact lens intolerance and there are several reports associating MGD as well as giant papillary conjunctivitis from contact lens use[2]. It was found that with giant papillary conjunctivitis in contact lens wearers, there is significantly more gland drop out and increased viscosity of the secretions[15]. It was found that 6.7% of the patients who used contact lenses had giant papillary conjunctivitis.

Conjunctival cicatrizing diseases like cicatricial pemphigoid, erythema multiforme and trachoma can cause OMGD by involving the tarsal plate by the cicatrization process. There were inconclusive findings of any statistically significant association with any of those conditions.

Conclusion

OMGD is a very common disease in patients visiting the eye clinic for routine check up and it can start as early as 7 years of age. Anterior blepharitis is commonly found among patients and it was hypothesized that it might play a role in the progression of the disease. Physicians believe that attention should be made to detect the early changes that

indicate the disease in an early life, as well as the presence of associated anterior blepharitis. Perhaps, it might have the controlling effect on the progression to the devastating irreversible gland loss that can occur later in life.

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نسبة وجود التهاب حافة الجفن الانسدادي بين المرضى المراجعين لعيادة العيون

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المستخلص. حوالي ٧٧,٦٪ من المرضى المراجعين لعيادة العيون مصابون بالتهاب حافة الجفن الانسدادي. معظم المصابين بالدرجة الأولى من المرض هم تحت سن العشرين، ومعظم المصابين بالدرجة الثانية في سن الخمسين، أما الدرجة الثالثة من المرض فهي موجودة في معظم المرضى في سن الستين. التهاب حافة الجفن الأمامي كان مصاحبا لمعظم المرضى مابين سن ٢٠-٤٠ سنة، لذلك فإن الباحث يعتقد أن لعمر المريض علاقة في تطور المرض، ولذلك فإن اكتشافه في مراحله الأولى وفي سن مبكرة قد يكون له الأثر في السيطرة على تطوره لمراحله الأخيرة.