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Prevalence and Identification of Demodex spp Related to Patients with Blepharitis Among Some Iraqi Population in Baghdad City

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Abstract. The study was conducted from May -December 2020 among 192 patients with chronic blepharitis attended to ophthalmology department of Al-Yarmuk central hospital in Baghdad city *Demodex* was found in (40.6%)78 patients, Men represented (46%)36 while women were (54%)42 with mean age of (49 ±0.23 y). According to ocular symptoms the foreign body sensation was 76 (97%), burning74(95%), itching73(94%) and redness 69(89%). The mean *Demodex* count range was the higher in patients with cylindrical sleeve, 3-5 mites represented (53%) and 6-8 mites (32%) followed by dandruff like materials3-5 mites (44%) and 6-8 mites (38%). The results of blepharitis patient eyelashes and lid margins bacterial culture showed that *Propionibacterium spp* represent (26.5%), (24.5%), *P.acnes* (21.8%),(22.4%) followed by *Staphylococcus spp*(17.2%),(19%) ,The most common bacterial isolated from Eyelashes of patient with demodex was *P.acnes* (41%) , *S. aureus* (34%) , *S.epidermidis* (15%) , *Achromobacter xylosoxidans* (6%) and *citrobacter* (4%).

Keywords. ocular infections, Demodex mite's infestation, Baghdad.

INTRODUCTION

Blepharitis is one of the most popular conditions in which the eyelids inflamed and become red irritated, sometimes there is burning sensation, itching with dandruff -like scales that forming on the eye lashes, increased the thickness and irregulating the eyelid margins plus the conjunctival hyperemia [1]. Blepharitis caused by various bacterial infections include *Staphylococci*, *Corynebacterium*, *Propionibacterium* , *Corynebacterium*, and *Enhydrobacter* species [2] .

Only *Demodex folliculorum* and *Demodex brevis* were identified to live on humans and deeply thought to be associated with blepharitis, dry eye, conjunctivitis and other corneal lesions [3] . increasing of mite infestation may be related to age, almost a half of individuals with mites could have a signs and symptoms of chronic blepharitis [4].

Demodex blepharitis define as a chronic inflammatory disease that caused by *Demodex* infestation, affecting the margin of the eye lid as well as the ocular surface, making a serious eye problem [5].

D. folliculorum are usually presence inside the hair follicles, while *D. brevis* has been reported to settle in the sebaceous glands. so, *D. folliculorum* found to the cause of chronic anterior blepharitis and *D. brevis* was reported the cause of posterior blepharitis [6]. Clarification of mites contributing to blepharitis will help in treatment, as it was supposed that *Demodex* mite can carry of *Bacillus spp* as a co-pathogen in blepharitis, recently *Demodex* are thought to be a mechanical carrier of some pathogens, the therapeutic strategies of *Demodex* depend on the limitation or eradication rate, and using a tea tree oil application with metronidazole ointment, [7]. The aim of the study is to identify the prevalence of *Demodex.spp* on eyelashes and lid margins its relationship with ocular surface condition in patients with blepharitis.

PATIENTS AND METHODS

All patients attended to ophthalmology department of Al-Yarmuk teaching hospital in Baghdad city between May–December 2020 and diagnosed with chronic blepharitis., the information documented directly from the patients and data were collected by using a structured and pre-tested questionnaire, the diagnosis was based on the slit-lamp bio-microscope and symptoms of ocular signs of blepharitis. Patients diagnosed having a cylindrical sleeve, crusting, scurf or matting were selected, and eyelashes samples were conducted by an ophthalmic surgeon for *Demodex* examination [8]. Microscopical examination showed the presence of *D. folliculorum* or *D. brevis* as a positive result. *Demodex* number and species were counted and the sample of the eyelashes were directly inoculated for culturing. [9]. *Demodex* mites' total number were recorded for each eye / lash by taking the percentage of patients lashes with mites that identified by light microscope [10].

microbiologic culturing of both the margins and eyelashes was done by using a moistened swab and inoculated on blood agar, chocolate agar, Mac-Conkey agar (Oxiod, Hampshire, UK) bacterial colonies Identification was done by using VITEK MS(bioMérieux, France) *E. coli* ATCC 8739 served as a control [11].

Statistical Analysis

Data were analyzed by using Chi-square test and SPSS 20.0 program was used for statistics, the level of significance 0.05 was adopted for all tests [12].

RESULTS

Out of 192 patients with chronic blepharitis attended to ophthalmology department. *Demodex* was found in (40.6%)78 patients, Men represented (46%)36 while women were (54%)42 with mean age of (49 ±0.23 y). The large number of *Demodex* was recorded in the mean age of 70±0.36, totally *D. folliculorum*: 263 and *D. brevis*: 59 were found in chronic blepharitis patients. the difference was significant between the two species as in table 1.

TABLE 1. Relation between *Demodex* species infestation and patient's age.

Age/years	Mean age ±SD	<i>Demodex</i> infestation %	<i>D. folliculorum</i> %	<i>D. brevis</i> %
18-38	28±0.12	19(24%)	34(13%)	12(20%)
39-59	49±0.23	28(36%)	62(24%)	21(36%)
60-80	70±0.36	31(40%)	167(63%)	26(44%)
	Total	78(100%)	263(100%)	59 (100%)

According to ocular symptoms the foreign body sensation was common among the patient 76 (97%), burning74(95%), itching73(94%) and redness 69(89%) as shown in figure 1.

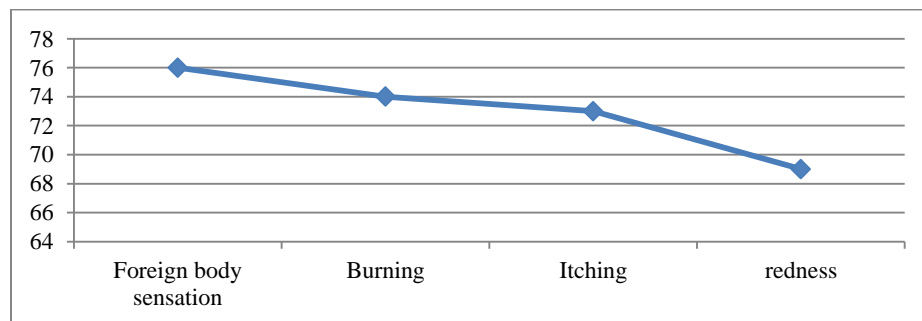


FIGURE 1. Prevalence the ocular symptoms in blepharitis patients related to *Demodex* infestation.

The mean *Demodex* count range was high in patients with cylindrical sleeve, 3-5 mites represented (53%) and 6-8 mites (32%) followed by dandruff like materials 3-5 mites (44%) and 6-8 mites (38%), there was no significant differences between the groups as in table 2.

TABLE 2. Relation between the clinical findings and the MDC range of mites%.

<i>Demodex</i> clinical findings	Patients with <i>Demodex</i> symptom n=78(100%)	MDC range of mites%			
		< 2	3-5	6-8	>9
Cylindrical sleeve	34	1(3%)	18(53%)	11(32%)	4(12%)
Dandruff like materials	27	2(7%)	12(44%)	10(38%)	3(11%)
Crusts	11	1(9%)	5(46%)	4(36%)	1(9%)
Scurf	6	0(0%)	2(33%)	3(50%)	1(17%)

p < 0.05

The results of blepharitis patient eyelashes and lid margins culture showed that *Propionibacterium spp* represent (26.5%), (24.5%), *P.acnes* (21.8%),(22.4%) followed by *Staphylococcus spp* (17.2%),(19%) and there was no significant differences between the two groups as in table 3. The most common bacterial isolated from eyelashes of patient with demodex was *P. acnes* 32 (41%), *S. aureus* 27 (34%) , *S.epidermidis* 12 (15%) , *Achromobacter xylooxidans* 5 (6%) and *Citrobacter* 3 (4%) as shown in figure 2.

TABLE 3. Bacterial positive culture among blepharitis patients.

Type of bacteria	Lid margin n=192(100%)	Eyelash n=192(100%)
<i>Propionibacterium spp</i>	51(26.5%)	47(24.5%)
<i>P.acnes</i>	42(21.8%)	43(22.4%)
<i>Staphylococcus spp</i>	33(17.2%)	37(19%)
<i>S. aureus</i>	27(14.1%)	30(15.6%)
<i>Streptococcus spp</i>	22(11.5%)	21(10.7%)
<i>Bacillus spp</i>	17(8.9%)	14(7.8%)

p < 0.05

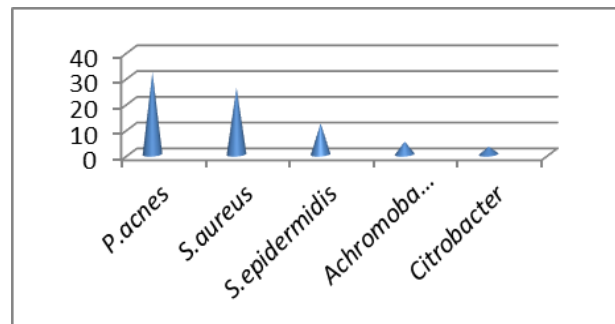


FIGURE 2. Bacterial isolation from eyelashes of demodex patients.

DISCUSSION

In this study *Demodex* infestation was found in (40.6%)78 with chronic blepharitis and agreed with other studies in Iraq and turkey [13,14]. Men represented (46%)36 while women were (54%)42 with mean age of (49 ±0.23 y) which agreed to other findings as an application of exogenous lipids in cosmetics can also help the growth of *Demodex* mites in females because females have lower androgen levels, therefore, females could be more susceptible [15,16]. However, some studies recorded highly incidence rates in males. [17,18]. Previous findings

confirmed the correlation between *Demodex* infestation and age [19, 20]. Which can be explained by having tissues contain mature follicles and glands in elderly, these are fully developed, this in some way provide the mites by their required nutrition [21]. another study found that the sex was not a factor conducive to infection, but their age was definitely correlated as a risk of infection [22]. foreign body sensation was very common among the patient and correlated with a high *Demodex* count followed by burning and itching and this may be due to the biting apparatus of the mite in the lid margin, the clinical findings revealed that cylindrical sleeve could be resulting from the mite's tendency to cluster at the roots of lashes [23].

Chronic *Demodex* in the eyelids can cause ocular surface severe inflammation, even a secondary infection by other pathogens can occur, the knowing and realizing of ocular microbial characters related to *Demodex* is very important for blepharitis prevention and treatment [24]. the results agreed with other previous studies that reported *P. acnes* isolates found within the blepharitis patients followed by *Staphylococcus spp* , *S. epidermidis* ,there is a strong relation of *Demodex* density which finally confirmed the relationship between *Demodex* and blepharitis [25] other studies showed that the bacterial highly frequency of *Staphylococcus*, *Propronibacterium*, and *Corynebacterium* species on the eyelid margin , while earlier studies recorded that *Staphylococcus. aureus* was the predominant isolate in blepharitis, this might be to the role of the parasite as a carrier of bacteria and acting as a co-pathogen in blepharitis development.[26].

CONCLUSION

Demodex infestation was the common condition among patients in the study. Higher number of *Demodex* mite's presence on the eye lashes and lid margin and leads to inflammation of ocular surface but if there is a low number of *Demodex* mites, symptoms may be disappeared as many studies improved that after lid hygienic activities and resolution of lash cuffing, mites could be remained hidden within the hair follicle, and that should alert the clinician to give the topic the utmost importance. Further studies would be helpful to recognize the opportunistic pathogens accompanied with *Demodex* infestation in the eyes.

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