Demodex Sp. Infestation in Anterior Blepharitis, Meibomian-Gland Dysfunction, and Mixed Blepharitis

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Demodex mite is an external parasite that belongs to Phylum Arthropoda, Class Arachnida, Order Acarina and can infest the meibomian and sebaceous glands. Although they normally inhabit the hair and eyelash follicles in low numbers, their over-proliferation may lead to lid-margin infection causing ocular-surface irritation and symptoms of ocular discomfort like itching, foreign-body or stinging sensation. It may also exacerbate coexisting lid-margin diseases like anterior blepharitis (staphylococcal and sebaceous) and posterior blepharitis (meibomian-gland dysfunction). Demodex infestation is an often-overlooked differential diagnosis in the clinical investigation of blepharitis and may be a cause of treatment failure when not specifically addressed.

This study determined the incidence and density of Demodex species on the eyelashes of subjects with normal eyelids, anterior blepharitis (AB), meibomian-gland dysfunction (MGD), and mixed blepharitis (MB).

MATERIALS AND METHODS

Consecutive patients who consulted at our centre, a tertiary care hospital over a period of 3 months with the diagnosis of meibomian-gland dysfunction (MGD), anterior blepharitis (AB), or mixed blepharitis (MB) were recruited into the study after obtaining informed consent from the patient and clearance from the institutional review board. The author established the diagnosis based on preset criteria of clinical findings using a single slit lamp biomicroscope (Topcon). Patients who were on topical ophthalmic medications over the past 3 months, except for artificial tears; with history of ocular or eyelid trauma and surgery, with previous diagnosis of chemical burns, Steven-Johnson syndrome, ocular cicatricial pemphigoid, with eyelid malpositions like...
entropion, ectropion, and dystrichiasis; or with signs of active ocular infection or inflammation other than blepharitis were excluded from the study. After the recruitment period for MGD, AB, and MB, 50 age-matched patients who consulted at the hospital for other eye complaints were recruited to serve as controls (normal). All patients underwent standard eye examinations. Data gathered included ocular symptomatology, and clinical findings. Digital photographs of the lid margins were taken using the digital camera of the same slit lamp biomicroscope. Lash sampling was done by epilating lashes. The collected lashes were checked for Demodex based on morphology using a light microscope and the total number of Demodex identified were tabulated for each eye per lash. The main outcome measure was the incidence of Demodex infestation, taken as the percentage of patients per group (Normal, MGD, AB, MB) that had lashes with mites identified using the light microscope.

The data was collected, tabulated using Microsoft excel and word, and analysed using chi square test. The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel were used to generate graphs, tables etc.

**RESULTS**

A total of 200 subjects were included, 150 symptomatic patients and 50 control patients. In the symptomatic group 33% were in 40-60 year age group and 44% in 60-80 year age group. In the control group 40% in 40-60 year age group and 30% in 60-80 year group. The gender distribution in both groups was 60% males and 40% females. The incidence of demodex sp infestation in symptomatic group was 78.7% and in asymptomatic group was 18%. Incidence of demodex is significantly more associated with symptomatic patients with P<0.001. Incidence of demodex infestation is more in cases of anterior blepharitis and mixed blepharitis. The mean demodex count between 3-5 mites (38.9%), 6-8 mites (44.4%) was associated with irritation as the symptom. The mean demodex count in symptomatic group was high in patients with cylindrical dandruff, 3-5 mites in 42.9% and 6-8 mites in 35.7%.

**DISCUSSION**

The conventional method of counting Demodex involves random epilation of four non adjacent lashes per lid and addition of a drop of oil (peanut oil is preferred) before mounting with a coverslip. This method carries the potential for the following errors. First, because the chance of detecting Demodex was much higher by sampling those with CD when compared with those without Cylindrical dandruff (CD) random epilation of lashes may result in a lower count if lashes without CD are epilated. Second, addition of oil before mounting the coverslip may induce undercounting, by allowing nonadherent Demodex
to float away, especially in those lashes without retained CD fragments. Third, even if lashes with CD were intentionally epilated, different amounts of CD fragments were actually retained. Fourth, Demodex embedded in compact CD fragments could not be counted with accuracy without adding alcohol. Fifth, even if only those lashes with clinically evident CD were epilated, some CD fragments that harbored Demodex still adhered to the lid skin. These potential errors collectively explain why use of the conventional method could lead to miscounting of Demodex.²

In our study, we followed a modified way of epilating the lashes. We epilated lashes with cylindrical dandruff and used carrier slide with a concavity, put a drop of saline and placed a cover slip. This prevented demodex to float away and count also was accurate. This study demonstrated the highest incidence and density in patients with mixed blepharitis, followed by anterior blepharitis. MGD patients have the lowest incidence and density among the three. This can be explained by the fact that patients with mixed and anterior blepharitis have involvement of the eyelashes because Demodex mites tend to be clustered to the roots of lashes.

The incidence and density of Demodex infestation were highest among patients with both anterior blepharitis and meibomian-gland dysfunction. Symptom of lid irritation and presence of cylindrical dandruff are indicative of high density count. These diagnosis and eye findings should alert the clinician about Demodex infestation of the eyelashes, especially in the elderly. Patients with recurrent blepharitis not responsive to current blepharitis treatment regimen should be investigated and treated for Demodex infestation. To best of our knowledge demodex infestation is never been thought in the treatment of blepharitis.

REFERENCES