The *Demodex* mites and their relation with seborrheic and atopic Dermatitis

Setareh Tehrani¹, Adnan Tizmaghz², Ghazaal Shabestanipour³*

¹Assistant professor, Dermatologist, Islamic Azad University of Tehran, Medical branch, Tehran, Iran
²Assistant Surgeon, Iran University of Medical Science, Tehran, Iran
³General physician, Shemiranat health center, Shahid Beheshti University of Medical science, Tehran, Iran

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**ABSTRACT**

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**Objective:** To determine the prevalence of seborrhoeic dermatitis (SD) and atopic dermatitis (AD) between the *Demodex folliculorum* (*D. folliculorum*) positive and *D. folliculorum* negative patients and to investigate any possible relationship between the *D. folliculorum* mites and the presence of SD and AD.

**Methods:** In this cross sectional study, authors collected samples from the skin around the nasal tip of 180 randomized patients who referred to Amir Al-Momenin Hospital dermatology clinic for skin erythema, scaling and pruritis, to examine the presence of demodicosis (*D. folliculorum*) infestation under optical microscope. Then authors assessed the prevalence of SD and AD between the *D. folliculorum* positive and *D. folliculorum* negative patients. Finally, data analysis using SPSS software and Chi-square test were performed.

**Results:** Our study showed no significant association between the demodicosis (*D. folliculorum*) and SD (*P* = 0.68) and AD (*P* = 0.70) prevalence.

**Conclusions:** According to the result of this study, the eradication of *Demodex* mites probably is not effective to reduces the prevalence of both dermatitis. However further investigation on a larger scale in a case–control study in this area is recommended.

1. Introduction

Seborrhoeic dermatitis (SD) and atopic dermatitis (AD) are recurrent and chronic skin diseases that are prevalent in society and in different age groups with various forms. They have a range of symptoms, from mild to very severe and can present a nuisance. However, no proven specific cause has been found for them until now. However, other causes besides the genetic and environmental component, like *Pityrosporum ovale* fungi may also play a role in causing SD. *Demodex* mites including *Demodex folliculorum* (*D. folliculorum*) and *Demodex brevis* live within hair follicles and sebaceous glands in the skin[1]. Up to now several studies have shown that *Demodex* mites could prompt an inflammatory response in rosacea patients[2–5]. Potential role of *Demodex* mites in SD and AD is unclear. Although some studies have suggested the influence of these mites on SD, there is no research on the association between AD and these mites[6,7]. In some studies, *Demodex* infestation also has increased the incidence of rosacea, steroid-dependent and primary irritant contact dermatitis[8]. In association with the eradication of the parasite from the skin surface, several treatments including topical tea tree oil and oral anti-parasitic drug such as ivermectin alone or in combination with metronidazole are used[9,10]. For the treatment of SD, various anti-inflammatory, anti-fungal and keratolytic agents have been used individually or in combination, which have had different effects on symptoms of SD[11–19]. In this study in the first step we decided to determine the prevalence of SD and AD in patient with *Demodex*
infestation compared with that of the patient who hadn’t Demodex infestation to investigate any possible relationship between the Demodex mites and the presence of SD and AD.

2. Materials and methods

The study was conducted between July 2011 and September 2012 in dermatology clinic of Amir Al-Momenin Hospital, Tehran. A total of 180 patients without any underlying medical condition with mild dermatologic complaints (mild itching or scaling or erythema) were recruited and scotch tape skin samples were taken with slight pressure on nose and cheeks of these patients. We coded the slides and examined them within two–three hours by light microscopy and evaluated them for the presence or absence of Demodex mites. In this study, we considered no difference between two species of Demodex mites (D. folliculorum, Demodex brevis) and we examined each slide for presence of mite positivity. Slides without sufficient sebum were excluded from the study and none of the cases had received any treatment for SD, AD and Demodex infestation before.

Data regarding the age, sex, and previous treatments were obtained from the notes. Comparability of Demodex positive and Demodex negative patients for sex, age, SD and AD was assessed by mean of the Chi–square test.

3. Results

In this study of 180 patients, 45% (n=81) of the subjects were male and 55% (n=99) were female. Mean age is (27±24.9) years, the age range is 14–73 years.

In skin samples from patients, 31.7% (n=57) were demodicosis negative and 68.3% (123 patients) were demodicosis positive.

About 35% (63 patients) were atopic positive and 65% of subjects (n=117) were atopic negative. Chronic and relapsing course of pruritis with specific distribution area, early age of onset and personal or familial history of asthma or hay fever or other atopic diseases were our criteria for AD diagnosis.

About 61.7% (111 subjects) of the subjects were seborrheic positive and 38.3% (n=69) were seborrheic negative. The skin erythema and pruritis in sebum–rich areas of the scalp, face, trunk and scales were our criteria for SD diagnosis. Among people with demodicosis (Demodex positive) 46.3% were male and 53.7% were women, and in patients without demodicosis 42.1% were men and 57.9% were female. There was no significant difference between the sex in Demodex negative and Demodex positive patients. Also there wasn’t a significant correlation between age and demodicosis.

The prevalence of AD among demodicosis positive individuals was 36.6% and in demodicosis negative people was 31.6%, which did show no statistically significant difference between the two groups in terms of AD prevalence.

The prevalence of SD in demodicosis positive individuals was 63.4% and in the demodicosis negative people was 57.9%, which showed no significant difference between the two groups in terms of SD prevalence.

4. Discussion

This study showed that Demodex mites have no effect on the increased prevalence of SD and AD.

Karinecaoğlu and his colleagues in Turkey in 2009 demonstrated that the prevalence of D. folliculorum was higher in patients with SD, which is inconsistent with our results[6]. This varying result may be due to differences in patients’ washing habits, and genetic and ethnic differences in Iran and Turkey, or differences in sampling techniques, sample size, type of study or may be due to other confounding factor. In this paper we use comedo extraction band technique for Demodex mites sampling.

Bikowski and Del Rosso conducted a research, during the years 2006–2008 in America, on 63 patients with refractory erythema/rash which was treated experimentally by crotamiton 2 times a day for demodicosis, and two visits were followed for the relief of rashes[7]. The results showed a significant improvement of resistant rashes[7].

A study in 2010 in America was done on 12 patients with refractory chronic blepharoconjunctivitis and at the age of 2.5–11 years; the prevalence of Demodex was 100% and after one week of treatment with tea tree oil, symptom of eye irritation was significantly improved in all patients,
and inflammation was also associated with a lower density of Demodex[10].

A study by Emre and his colleagues in Turkey in 2009 demonstrated that D. folliculorum infestation was higher in Behcet disease and mite elimination may be useful, even in patients without any complaint, for the treatment of ocular and eyelid discomforts of these patients[20].

However, further analytic or experimental investigation into the possible role of Demodex mite and its elimination effect on the treatment of SD and AD is recommended.

Conflict of interest statement

There is no conflict of interest to report by any of the authors.

References