

Evaluation of Demodex mite in chronic urticaria

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Abstract

Objective: Determining the possible role of Demodex mites in patients with chronic urticaria

Methods: Demodex screening results in 49 patients with chronic urticaria were evaluated retrospectively.

Results: The mean number of Demodex mites per 1 cm² measured with standardized skin-surface biopsy (SSSB) was 0.89 which was at a similar level as control groups in the literature.

Conclusion: Demodex mites seemed not to play a role in patients with chronic urticaria who had no facial eruptions. Patients with skin eruptions with the possible contribution of Demodex as rosacea could be investigated for chronic urticaria in other studies.

Keywords: Demodex; Mites; Acarina; Chronic urticaria; Standardized skin-surface biopsy

1. Introduction

Demodex follicularum is a parasite that lives in seborrheic areas such as the chin, cheeks, nose, and forehead. It can be found as a commensal in healthy individuals and also appears as an agent that triggers some skin diseases when its number increases [1]. Abnormal increase of Demodex mites with clinical skin manifestations is called demodicosis [2]. Studies of the Demodex parasite in acne vulgaris, seborrheic dermatitis, and acne rosacea have shown the role of the parasite in these diseases [2,3]. The presence of more than five parasites in a 1 cm² area is considered sufficient for the parasite to cause skin disease [1,2], however, it has been stated that this number was the result of a limited number of studies [4]. It is stated that immunosuppression may also lead to an increase in the number of Demodex [4]. If urticaria persists for more than 6 weeks, it is called chronic urticaria, and most of the time the cause cannot be found. It has been stated that house dust mites may play a role in chronic urticaria [5]. Demodex mites, house dust mites, and scabies mites belong to the order of acarina [4]. Our study aims to evaluate the results of the Demodex screening to determine the possible role of Demodex in chronic urticaria patients whose cause has not been found.

2. Material and Methods

Patients who applied to the dermatology outpatient clinic between November 2021 and April 2022, were diagnosed with chronic urticaria of unknown cause and underwent Demodex screening were evaluated retrospectively. 49 patients with chronic urticaria were included in the study. We retrospectively evaluated the Demodex number in

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patients with chronic urticaria from the records of our dermatology clinic. The patients had no lesions on their faces. The majority of patients were followed up with the allergy clinic and had other allergic diseases. Patients were also evaluated for asthma, allergic rhinitis, and allergic conjunctivitis accompanying chronic urticaria. Standardized skin-surface biopsy (SSSB), which is the standard method for screening Demodex, is a non-invasive method, and was used in our study [6]. SSSB was performed by the same investigator (A.A). Cyanoacrylate glue was poured onto the slides, on which a 1 cm² area was marked with a marker pen, and then applied to the patients' faces. The forehead, right cheek, chin, left chin, and nose areas were examined; cheek examinations were performed on the zygomatic area because of technically easy to perform due to its convexity and because of the beard in men. For men, because the chin was with hairs, the chin area was excluded and only four areas were used. The slides were examined under a microscope and the presence of Demodex parasites above five per cm² is considered positive [7]. Descriptive statistics were given as Mean \pm Standard Deviation and Median values. This study was conducted under the Helsinki criteria after approval by the Izmir Katip Çelebi University Ethics Committee (approval number: 37, date 15.02.2024).

3. Results

There were 42 female and 7 male patients. The mean age of the patients was 38.51, and standard deviation was 13.05, and the median was 37. The mean duration of the disease in years was 5.42, the standard deviation was 6.64, and the median was 2 (Table 1). In terms of additional allergic diseases, allergic rhinitis in 23 patients, asthma in 12 patients, and conjunctivitis in 2 patients were detected. The number of patients with no additional allergic diseases was 23 (Table 2). The mean age of patients with no additional allergic diseases was 38.3, and the mean age of patients with additional allergic disease(s) was 38.7.

The mean number of Demodex on the forehead was 0.92, the standard deviation was 2.23, and the median was 0. The mean number of Demodex on the right cheek was 1.18, the standard deviation was 2.04, and the median was 0. The mean number of Demodex on the chin was 0.62, the standard deviation was 2.25, and the median was 0. The mean number of Demodex on the left cheek was 1.02, the standard deviation was 2.4, and the median was 0. The mean number of Demodex on the nose was 0.73, the standard deviation was 2.58, and the median was 0. The minimum and maximum (minimum-maximum) Demodex numbers per 1 cm² were found as 0-11, 0-8, 0-14, 0-14, and 0-16 for the forehead, right cheek, chin, left cheek, and nose, respectively. (Table 3). The mean number of Demodex in the five areas tested of all the patients was 0.89. The mean number of Demodex in the five areas tested in patients aged 50 and over was 1.64. The mean number of Demodex in the five areas tested in patients with no additional allergic diseases was 0.72. The mean number of Demodex in the five areas tested in patients with additional allergic disease(s) was 1.05. The Demodex count was found to be above 5 in one or more areas of the eight patients, but the average Demodex count of the five measured areas was below 5 in seven of the eight patients. The average Demodex count was found to be 5.4 in one of the eight patients. The patient was a 55-year-old male with sebaceous skin and accompanying asthma and rhinitis.

Table 1 Patients' characteristics of age and disease duration

	Age	Duration of chronic urticaria (years)
Mean \pm standard deviation	38.51 \pm 13.05	5.42 \pm 6.64
Median	37	2

Table 2 Allergic diseases accompanying the patients

	No accompanying allergic disease	Rhinitis	Asthma	Conjunctivitis
Number of patients	23	23	12	2

Table 3 Densities of Demodex mites in the different regions of the patients

	Forehead (number/cm ²)	Right cheek (number/cm ²)	Chin (number/cm ²)	Left cheek (number/cm ²)	Nose (number/cm ²)
Mean standard deviation ±	0.92 ± 2.23	1.18 ± 2.04	0.62 ± 2.25	1.02 ± 2.4	0.73 ± 2.58
Median	0	0	0	0	0
Minimum-maximum	0-11	0-8	0-14	0-14	0-16

4. Discussion

In our study, the average number of Demodex mites was 0.89 in patients with chronic urticaria, and that was lower or slightly higher than the averages of control patients reported in the studies conducted in the literature. Forton et al. stated that the means of Demodex mites were 0.7, 1, 2, and 0.55 in four different studies consisting of 45, 42, 42, and 30 healthy individuals constituting the control groups, respectively [6,8].

Demodex mites are normally found on pilosebaceous units, and infestation is stated to increase with age, 91% of people over 71 years old were reported to be infested [9]. In our study, the mean number of Demodex was found to be higher in the patients aged 50 and over, and compatible with the literature.

It was reported that although demodicosis manifests generally as papulopustular eruptions on the face, some patients with demodicosis experience only itching and/or erythema on the face [10]. It was stated that Demodex mites cause a severe immune response with spongiosis and lymphocytic infiltrate in histological sections around Demodex-infested follicles, but no inflammation was reported to be detected in non-infested ones [9]. Our hypothesis in the study was that the increased number of Demodex in the follicles, but not as high as to cause demodicosis, might lead to an immune response that could be associated with chronic urticaria, but we did not detect a mean of increased number of mites compared to the control groups in the literature.

Although there is no significant age difference between those with and without additional allergic diseases, the number of Demodex was higher in those with additional allergic diseases. This may be due to the nasal or inhaler steroids used by the patients causing immunosuppressive effects. One of our patients had an average Demodex count of 5.4 and had no skin lesions, but he was a 55-year-old man, had thick sebaceous skin, and was using inhaled and nasal steroids for asthma and rhinitis.

It was stated that house dust mites can trigger chronic urticaria attacks [11]. It was reported as a case report that scabies may cause urticaria [12]. An increase in the number of Demodex was noted in rosacea disease compared to the control groups [2]. In a study, it was stated that urticaria was seen in more than 5% of patients with rosacea. We recommend that studies be conducted to determine whether patients with high demodex count have a higher incidence of chronic urticaria.

5. Conclusion

Demodex was not detected at increased numbers in the average of our patients with chronic urticaria. However, we think that it would be appropriate to conduct studies in patients with demodicosis whether they have a higher incidence of chronic urticaria.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest is to be disclosed.

Statement of ethical approval

This study was conducted under the Helsinki criteria after approval by the Izmir Katip Çelebi University Ethics Committee (approval number: 37, date 15.02.2024).

References

- [1] Zhao YE, Guo N, Wu LP. Influence of temperature and medium on viability of *Demodex folliculorum* and *Demodex brevis* (Acari: Demodicidae). *Exp Appl Acarol.* 2011;54(4):421-425.
- [2] Chang YS, Huang YC. Role of *Demodex* mite infestation in rosacea: A systematic review and meta-analysis. *J Am Acad Dermatol.* 2017;77(3):441-447.e6.
- [3] Zeytun E, Tilki E, Doğan S, Mumcuoğlu KY. The effect of skin moisture, pH, and temperature on the density of *Demodex folliculorum* and *Demodex brevis* (Acari: Demodicidae) in students and staff of the Erzincan University, Turkey. *Int J Dermatol.* 2017;56(7):762-766.
- [4] Chen, W, and G Plewig. "Human demodicosis: revisit and a proposed classification." *The British journal of dermatology* vol. 170,6 (2014): 1219-25.
- [5] Mahesh, P. A., Kushalappa, P. A., Holla, A. D., & Vedanthan, P. K. (2005). House dust mite sensitivity is a factor in chronic urticaria. *Indian journal of dermatology, venereology and leprology*, 71(2), 99–101.
- [6] Forton, F, and B Seys. "Density of *Demodex folliculorum* in rosacea: a case-control study using standardized skin-surface biopsy." *The British journal of dermatology* vol. 128,6 (1993): 650-9.
- [7] Yun, C. H., Yun, J. H., Baek, J. O., Roh, J. Y., & Lee, J. R. (2017). *Demodex* Mite Density Determinations by Standardized Skin Surface Biopsy and Direct Microscopic Examination and Their Relations with Clinical Types and Distribution Patterns. *Annals of dermatology*, 29(2), 137–142.
- [8] Forton, F, and M Song. "Limitations of standardized skin surface biopsy in measurement of the density of *Demodex folliculorum*. A case report." *The British journal of dermatology* vol. 139,4 (1998): 697-700.
- [9] Elston, Carly A, and Dirk M Elston. "Demodex mites." *Clinics in dermatology* vol. 32,6 (2014): 739-43.
- [10] Karıncaoglu, Yelda et al. "The clinical importance of *Demodex folliculorum* presenting with nonspecific facial signs and symptoms." *The Journal of dermatology* vol. 31,8 (2004): 618-26.
- [11] Chong, Albert C et al. "Aeroallergens in Atopic Dermatitis and Chronic Urticaria." *Current allergy and asthma reports* vol. 22,7 (2022): 67-75. doi:10.1007/s11882-022-01033-2
- [12] Muller, Imelda, and Alyson Brinker. "A Case of Scabies Presenting as Chronic Urticaria." *Military medicine* vol. 185,9-10 (2020): e1854-e1856.