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# Incidence of Atopic Stigmata and Prick Test Results in Patients with Asthma, Allergic Rhinitis and Conjunctivitis

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**SUMMARY** Allergic diseases are part of the 'modern lifestyle' and their incidence is still increasing. Cutaneous markers (stigmata) usually provide valuable clues for the diagnosis of atopic diseases. This study evaluated the prevalence of the four major and twenty-one minor criteria of Hanifin and Rajka in a total of 246 patients with mucosal allergies (99 asthma, 108 allergic rhinitis, and 39 allergic conjunctivitis). The two most prevalent major criteria were history of atopic diseases and pruritus. The most prevalent three minor criteria were periorbital darkening, influence of environmental factors and xerosis. The most common prick test-positive allergens were grass and mite allergens. Despite evidence for a high co-morbidity between atopic diseases, in daily clinical practise diagnostic and therapeutic procedures generally focus on the most predominant disease. We concluded that it may be important to screen subjects with mucosal allergies for the presence of major and minor cutaneous stigmata. Screening for cutaneous manifestations and subsequent treatment might further enhance the quality of life of these patients.

Atopy is defined as the genetic predisposition to produce immunoglobulin E (IgE) antibodies in response to allergens. IgE antibodies to various allergens can be assessed by skin prick test. The skin has a signalling function for allergic reactions and serves as a test organ for allergic diseases of other systems such as allergic rhinitis, conjunctivitis, and asthma. A positive correlation usually exists between cutaneous and mucosal allergies.[1,2] Therefore, the dermatological examination is gaining importance in the definition of risk groups and for the follow up of patients. To determine the correlation between skin and mucosal allergy, the major and minor criteria of Hanifin and Rajka[3] were evaluated in out-patients who had an epidermal prick test because of asthma, allergic rhinitis, and conjunctivitis. The presence of at least two major and/or three minor criteria was accepted as meaningful. Occupation and habitation of the patients as well as the frequency of atopic skin features and the results of the prick tests were discussed.

## MATERIALS AND METHODS

Patients from the departments of chest, ear-nose-throat, and eye diseases, who were referred for prick tests, were included in the study. The epidemiologic features (age, sex, occupation), major and mi-

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nor atopic cutaneous properties obtained from dermatological examination or history, and prick test results were all recorded on a standardized form. A standardized series of 14 allergens with positive (histamine hydrochloride 1 mg/ml) and negative (diluent) controls (Center Laboratories, Port Washington, NY, USA) was applied to the frontal sides of the left forearms of the patients by using a commercial aparatus provided by the supplier. After 15 minutes the tested areas were examined for the presence of a wheal and/or flare. Reactions more than 5 mm in size or equal to or bigger than 75% of the positive control were accepted as positive.[4] A written informed consent was obtained from all patients.

## RESULTS

A total of 246 patients (99 asthma, 108 allergic rhinitis, and 39 allergic conjunctivitis) were included in the study. One hundred and fifty patients were female and 96 male with a mean age of 21.4 years. The majority (93%) was living in an urban area. Most patients were house keepers (30%), students (30%), or teachers (15%).

The two most prevalent major criteria were history of atopic diseases (77%) and pruritus (44%). The most prevalent three minor criteria were periorbital darkening (49%), influence of environmental factors (42%), and xerosis (40%) (Table 1).

At least two major criteria were obtained in 81 (33%) patients (asthma 30, allergic rhinitis 33, and allergic conjunctivitis 18) and at least three minor criteria were determined in 183 (74%) patients (asthma 81, allergic rhinitis 66, and allergic conjunctivitis 36) (Table 2).

The most common prick test-positive allergens in our patients were grass (46%) and mite (41%) allergens (Table 3).

## DISCUSSION

Atopic dermatitis, asthma, allergic rhinitis, and allergic conjunctivitis are all atopic diseases. Various factors (genetic, environmental, immunological, biochemical, emotional, etc.) contribute to the pathogenesis of these disorders.[1,2,5] It has been established that environmental factors and lifestyle during childhood, even during the fetal period, have an important influence on the pathogenesis of atopic diseases.[6] It was also found that to live in houses built with modern construction techniques is a risk factor for atopic diseases.[7] Most of our patients were from such urban environments.

The combination of cutaneous and mucosal allergy generally represents a more advanced form of the atopic syndrome (atopic march). It has been established that approximately half of the atopic dermatitis patients, particularly with severe disease, will develop asthma and two thirds will develop allergic rhinitis. Skin sensitization with subsequent migration of sensitized T cells into the nose and airways, has been considered to be responsible, causing upper and lower airway inflammation.[8] It has been concluded that patients with atopic dermatitis have a higher prevalence of nasal symptoms and definite rhinitis than patients without skin disease.[9]

In the present study, we determined various allergic skin features in patients with mucosal allergies. The most common two major criteria were a positive history of atopic diseases and pruritus, whereas the most common three minor criteria were periorbital darkening, influence of environmental factors and xerosis. In one study, 58% of patients who had a prick test for allergic diseases reported an atopic history.[10] Our ratio (77%) was higher, probably because of the heterogeneity of our study population. In another study, the incidence of allergic diseases in children with rhinitis was 22.9%.[11] Our ratio was significantly lower than this level, again probably because of differences in age, geographic region, occupation, etc.

There are some discrepancies in the literature on the validity of the Hanifin and Rajka criteria.[12] In one study, history of itchy rash, history of flexural dermatitis, chronicity more than 6 months, visible xerosis, periorbital dermatitis, and perifollicular accentuation were determined as meaningful criteria.[13] In another study, only xerosis, the influence of environmental factors, and facial erythema were seen in a majority of patients and were therefore considered useful in the diagnosis of atopic dermatitis.[14] We found that an atopic history, pruritus, periorbital darkening, influence of environmental factors, and xerosis were meaningful

**Table 1** List of atopic stigmata

| | **Asthma** (N = 99) | **Allergic rhinitis** (N = 108) | **Allergic conjunctivitis** (N = 39) | **Total** (N = 246) |
|---|---|---|---|---|
| ***Major criteria*** | | | | |
| **1. History of atopic diseases** | 96 | 60 | 33 | 189 (77%) |
| **Asthma** | 63 | 30 | 9 | 102 |
| **Allergic rhinitis** | 21 | 18 | 9 | 48 |
| **Allergic conjunctivitis** | 9 | 9 | 12 | 30 |
| **Atopic dermatitis** | 3 | 3 | 3 | 9 |
| **2. Pruritus** | 48 | 51 | 9 | 108 (44%) |
| **3. Chronically-relapsing dermatitis** | 9 | 6 | 4 | 19 (8%) |
| **4. Typical morphology-distribution** | 2 | 5 | 3 | 10 (4%) |
| **Total** | 155 | 122 | 49 | 326 |
| ***Minor criteria*** | | | | |
| **1. Periorbital darkening** | 35 | 63 | 12 | 120 (49%) |
| **2. Influence of environmental factors** | 33 | 39 | 32 | 104 (42%) |
| **3. Xerosis** | 33 | 35 | 31 | 99 (40%) |
| **4. Intolerance to wool** | 30 | 24 | 26 | 80 (33%) |
| **5. Itch when sweating** | 15 | 30 | 24 | 69 (28%) |
| **6. Facial erythema** | 21 | 18 | 16 | 55 (22%) |
| **7. Cheilitis** | 6 | 36 | 6 | 48 (20%) |
| **8. Palmar hyperlinearity** | 15 | 18 | 12 | 45 (18%) |
| **9. Tendency to herpes virus infection** | 12 | 24 | 6 | 42 (17%) |
| **10. Influence of emotional factors** | 12 | 21 | 8 | 41 (17%) |
| **11. Keratosis pilaris** | 12 | 15 | 13 | 40 (16%) |
| **12. Hand-foot eczema** | 27 | 9 | 4 | 40 (16%) |
| **13. Dennie-Morgan fold** | 9 | 18 | 11 | 38 (15%) |
| **14. Intolerance to food** | 15 | 12 | 10 | 37 (15%) |
| **15. Pityriasis alba** | 11 | 12 | 14 | 37 (15%) |
| **16. White dermographism** | 10 | 11 | 9 | 30 (12%) |
| **17. Facial pallor** | 6 | 6 | 7 | 19 (8%) |
| **18. Staphylococcal infection** | 3 | 9 | 5 | 17 (7%) |
| **19. Herpetic infection** | 4 | 6 | 6 | 16 (7%) |
| **20. Ichthyosis** | 5 | 4 | 5 | 14 (6%) |
| **21. Nipple eczema** | 3 | 2 | 5 | 10 (4%) |
| **Total** | 317 | 412 | 261 | 991 |

manifestations of atopy in patients with mucosal allergy.

It has been reported that causative allergens are changing with age, the geographical area, and that the most common allergens are inhalants from nature.[15] In one study, the most common allergens in patients with allergic rhinitis, asthma, or both were from *Dermatophagoides pteronyssinus*, *D. farinae*, and cockroach, respectively.[16] In another study, mites, pollens (cereal, grass, and tree), and mold were established as most common causative allergens in children with respiratory allergy.[17] We determined grass pollens and mites as major causative allergens in our study group. Avoidance of these allergens could help to improve the symptoms and signs.

We conclude that although not specific, most stigmata are characteristic markers not only of

**Table 2** The distribution of patients with at least two major and three minor atopic stigmata

| | Asthma (N = 99) | Allergic rhinitis (N = 108) | Allergic conjunctivitis (N = 39) | Total (N = 246) |
|---|---|---|---|---|
| **At least two major criteria** | 30 | 33 | 18 | 81 (33%) |
| **At least three minor criteria** | 81 | 66 | 36 | 183 (74%) |
| **Total** | 111 | 99 | 54 | 264 |

**Table 3** Prick test results

| | Asthma (N = 99) | Allergic rhinitis (N = 108) | Allergic conjunctivitis (N = 39) | Total (N = 246) |
|---|---|---|---|---|
| **Allergens*** | | | | |
| **1. Grass mix-1** | 24 | 24 | 12 | 60 (24%) |
| **2. Grass mix-2** | 21 | 21 | 12 | 54 (22%) |
| **3. *Dermatophagoides pteronyssinus*** | 21 | 18 | 13 | 52 (21%) |
| **4. *Dermatophagoides farinea*** | 18 | 18 | 14 | 50 (20%) |
| **5. Tree mix-1** | 9 | 9 | 15 | 33 (13%) |
| **6. House dust** | 15 | 12 | 6 | 33 (13%) |
| **7. Tree mix-2** | 9 | 12 | 9 | 30 (12%) |
| **8. Sheep wool** | 9 | 9 | 10 | 28 (11%) |
| **9. Mixed epidermal** | 9 | 6 | 8 | 23 (9%) |
| **10. Cat pelt** | 7 | 6 | 6 | 19 (8%) |
| **11. *Aspergillus fumigatus*** | 6 | 8 | 5 | 18 (7%) |
| **12. Mold mix** | 3 | 3 | 6 | 12 (5%) |
| **13. Cotton linters** | 3 | 4 | 4 | 11 (5%) |
| **14. Cockroach** | 4 | 3 | 4 | 11 (5%) |
| **Total positive** | 157 | 153 | 124 | 434 |
| **Negative** | 54 | 57 | 21 | 132 |

*Grass mix-1: Wheat, barley, oat, rye;
Grass mix-2: Corn, Bermuda grass, perennial rye grass, Orchard grass, Kentucky blue, spring grass, meadow fescue;
Tree mix-1: Willow, beech, maple, black mulberry, lime-tree, juniper, pine;
Tree mix-2: *Betula pendula*, olive tree, poplar, peanut, oat, black alder, white ash;
Mixed epidermal: Hen, duck, goose, wool, cotton, silk, horse dander, dog and cat epithelium and dander

atopic dermatitis, but of other atopic diseases and that the presence of cutaneous symptoms and signs needs to be examined in all patients with mucosal allergy.

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