

# Occupational contact urticaria syndrome caused by globe artichoke (*Cynara scolymus*)

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Although hypersensitivity reactions to foods usually occur after ingestion, it is increasingly recognized that food antigens can also cause systemic allergic symptoms both through inhalation and after percutaneous absorption.<sup>1-3</sup> Significant exposure to food allergens through the respiratory and cutaneous routes occurs mainly among food handlers in the workplace and also among homemakers. We describe a patient in whom allergic skin and respiratory symptoms developed after handling globe artichokes at work. The globe artichoke (*Cynara scolymus*) is a Compositae plant, allied to the thistles, and widely cultivated in kitchen gardens. Its edible portions are the fleshy bases of the scales of the gigantic thistle-like flower and its receptacle or inner "heart," after being boiled.

## CASE REPORT

A 20-year-old woman, who was a nonsmoker, came to our allergy clinic because of an acute episode of generalized urticaria; angioedema of the hands, forearms, and face; nasal itching and rhinorrhea; red, itchy, and watery eyes; and dyspnea, cough, and chest tightness. The patient had experienced these symptoms while she was at work handling globe artichokes. Her job consisted of separating the bud (edible part) from the stem and leaves of freshly harvested artichoke plants. She did not wear gloves at work. Despite ceasing this activity and taking oral antihistamines, her symptoms worsened within 24 hours. She required treatment, in the emergency department, for a severe asthma attack with  $\beta$ -mimetics, oxygen, and systemic corticosteroids. The patient was discharged 1 day later, and the dose of corticosteroids was tapered over 2 weeks, with no further recurrence of symptoms. Because of the severity of her symptoms, she did not return to work after this episode.

The patient had been working in a vegetable-processing plant for 5 years, and further enquiry revealed that during the last 2 years she had noticed that contact with

artichoke leaves elicited immediate pruritic wheals and swelling in the contact area and, occasionally, generalized urticaria with or without angioedema. These symptoms often subsided spontaneously within a few hours by avoiding exposure to artichokes and occasionally after taking antihistamines. She had no personal or family history of atopy, and she had not previously experienced asthma attacks or other respiratory or cutaneous conditions. During weekends and holidays and out of the artichoke harvesting season she was free of symptoms. She had no symptoms after handling other vegetables at work (e.g., lettuce, endive), and she was able to eat cooked artichokes without any ill effect.

Physical examination disclosed no abnormalities. Complete blood count, chemistry, serum protein electrophoresis, and serum immunoglobulins were normal except for total IgE, which was elevated (171 kU/L). Results of chest and sinus roentgenograms and spirometry were within normal limits. Allergy and challenge tests were performed 1 month after the last episode had occurred, when she was free of symptoms and taking no medication. Results of skin prick tests with a battery of common inhalant and food allergens including milk, egg, fish, shellfish, nuts, and wheat (Alergia Abelló S.A., Madrid, Spain) were negative. Prick tests were also done with different parts of the artichoke plant and with other vegetables belonging to the Compositae family. The leaves and stem of the artichoke plant are covered with a thin layer of white, tiny hairs (fuzz). This fuzz was carefully separated by scraping it, and a 10% wt/vol extract in phosphate-buffered saline was made as previously described for other vegetable allergens.<sup>2</sup> In addition, an extract of artichoke seeds was also made in phosphate-buffered saline at a concentration of 10% wt/vol. The results of skin prick tests are shown in Table I. Results of skin prick tests with the same globe artichoke reagents in three atopic and three control subjects not exposed to this vegetable were negative.

The patient's forearm was gently rubbed with an artichoke leaf for 30 seconds. A strong reaction with confluent wheals, flare, and edema on the contact area occurred within 15 minutes. Patch testing for delayed hypersensitivity was carried out with the European standard series and with artichoke, lettuce, endive, the sesquiterpene lactone mix, and alantolactone; only nickel sulfate produced a positive reaction at the 96-hour reading. To detect specific IgE antibodies, the 10% wt/vol artichoke fuzz extract was coupled to nitrocellulose disks,<sup>2</sup> and the standard RAST technique

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**TABLE I.** Results of skin prick tests with salad plants of the Compositae family

|                                          | Concentration<br>(wt/vol) | Wheal diameters<br>(mm) | Surrounding<br>flare |
|------------------------------------------|---------------------------|-------------------------|----------------------|
| Artichoke ( <i>Cynara scolymus</i> )     |                           |                         |                      |
| Scale (bud)                              | As is                     | 2 × 2                   | No                   |
| Stem                                     | As is                     | 4 × 3                   | Yes                  |
| Leaf                                     | As is                     | 6 × 5                   | Yes                  |
| Fuzz (from stem and leaves)              | 10%                       | 20 × 11                 | Yes                  |
| Seed                                     | 10%                       | 4 × 3                   | Yes                  |
| Lettuce leaf ( <i>Lactuca sativa</i> )   | As is                     | 4 × 4                   | Yes                  |
| Endive leaf ( <i>Cichorium endivia</i> ) | As is                     | 0                       | No                   |
| Chicory ( <i>Cichorium intybus</i> )     | 10%                       | 0                       | No                   |
| Saline solution                          | 0.9%                      | 0                       | No                   |
| Histamine phosphate                      | 1%                        | 6 × 6                   | Yes                  |

was carried out with Phabebas RAST reagents (Pharmacia, Uppsala, Sweden). RAST value in response to artichoke was 0.7 PRU/ml (class 2). Specific IgE antibodies to lettuce, cabbage, celery, and mugwort pollen, as determined by commercial Phadebas RAST, were not found in the patient's serum. RAST responses to globe artichoke in three control subjects were negative.

A methacholine inhalation test was done, and it revealed that the patient's bronchial responsiveness was within the normal range. A specific bronchial challenge test with artichoke fuzz extract was carried out as previously described,<sup>2</sup> and no response was observed.

## DISCUSSION

The clinical picture of this patient, with a predominance of relapsing cutaneous immediate symptoms and only one episode of bronchospasm accompanied by generalized urticaria and angioedema, is compatible with the diagnosis of contact urticaria syndrome. Both the clinical history and the results of allergy tests pointed out that type I allergy to artichoke antigen or antigens had developed. According to skin test results, the antigens seem to be mainly localized in the thin, hairy layer (fuzz) covering the artichoke leaves and stem. On the contrary, the scales of the bud, which constitute the edible part, were relatively allergen-free, or perhaps the antigen was more labile or difficult to extract from this portion of the plant. The absence of a history of asthma attacks and the negative results of inhalation challenge tests with both methacholine and artichoke extract seem to indicate that this patient does not have bronchial asthma. Although results of methacholine and specific challenges may be negative in a previously sensitized patient with occupational asthma after a period away from work, this patient's clinical history was not suggestive of occupational asthma. Therefore it is likely in this case that the skin was the main route of sensitization and ab-

sorption of the antigen, although inhalation of artichoke particles may have also played a role. Contact urticaria describes a wheal-and-flare response elicited within 60 minutes after cutaneous exposure to certain antigens. However, the clinical manifestations are heterogeneous, varying from localized or generalized urticaria to concurrent involvement of other organs, mainly the respiratory and gastrointestinal tracts.<sup>3</sup> From the combination of cutaneous and respiratory symptoms, this case should be regarded as a third-stage contact urticaria.<sup>3</sup>

Delayed contact allergy caused by globe artichoke<sup>4</sup> and by related salad plants of the Compositae family, such as lettuce (*Lactuca sativa*) and endive (*Cichorium endivia*),<sup>5</sup> has been described. Immediate-type allergy to lettuce and endive, manifested as contact urticaria<sup>5</sup> has also been reported. However, to the best of our knowledge, this is the first report of contact urticaria syndrome caused by artichoke. The inedible portions of the artichoke plant (stem and leaves) were probably the main cause of the cutaneous and respiratory symptoms. The results of skin tests and RAST support an immunologic mechanism of urticaria.

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