

Angioedema Due to Chironomida Larvae used as Fish Food

Sir,

Chironomidae are a family of non-biting midges (order: Diptera), with between 5,000 and 10,000 species in wet areas with rivers and lakes throughout the world. In recent years, hypersensitivity to Chironomus.

We here describe recurrent angioedema in the owner of a home aquarium sensitized to *Chironomus thummi thummi* (CTT) larvae used as fish food.

CASE REPORT

A 24-year-old male student, with a personal history of atopy, complained of seasonal rhinitis, which occurred every year in spring (March–June), and urticaria-angioedema features which appeared after ingestion of crustacea. Past medical history was otherwise non-contributory. There was no evidence of drug hypersensitivity. Pertinent family history consisted of atopic diseases (hay fever and asthma) in several siblings.

The patient came to our outpatient allergy unit because of recurrent episodes of angioedema of the eyelids and lips when feeding fish in an aquarium using a lyophilized product of CTT larvae. The areas of the distorted swellings were slightly erythematous and very itchy, reaching a peak within a few minutes and then disappearing after a couple of hours. The patient also reported that he had once developed acute asphyxia probably as a result of oedema of the tongue and laryngeal or pharyngeal oedema.

Allergological evaluations

Partial purification of the CTT larvae allergens was performed as described by Kawai & Koshi (6). The CTT larvae were extracted with an 0.025 M phosphate buffer (pH 8.6). Supernatants were collected after centrifugation at 12,300 g for 20 min. The supernatant filtrate was used as the raw extract. All procedures were performed at 4°C. The skin prick test performed with CTT larvae raw extract (at a dilution of 1/10,000 w/v, 0.01 mg/ml), showed a marked positivity (double the size of a positive histamine control) after 15 min. A higher level of Chironomus specific IgE antibodies (25.5 kU/l) was detected with the Pharmacia CAP System fluorimetric test. Total IgE was 520 IU/ml. Skin prick tests and RAST performed with common inhalant and food allergens were positive to Parietaria judaica and Crustacea extracts.

Specific provocation test, consisting of handling and sniffing an open jar of lyophilized Chironomus larvae, resulted positive and caused the appearance of angioedema features localized on the eyelids and lips within 30 min.

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The skin prick test performed with CTT larvae raw extract (at a dilution of 1/10,000 w/v, 0.01 mg/ml), showed a marked positivity (++++) after 15 min. A high level of Chironomus-specific IgE antibodies was detected with the Pharmacia CAP System fluorimetric test. Total IgE was 520 IU/ml.

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DISCUSSION

After several investigations, it can be said that Chironomidae haemoglobins are some of the most easily characterized allergens which induce IgE-mediated diseases in humans. CTT express 12 homologous haemoglobins (Chi t I, with its components: I, IA, IB, III, IIA, IV, VI, VIIA, VIIB, VIII, IX, X) (7).

Genetic factors seem to be important in determining susceptibility to this kind of allergy. Statistical analysis showed that some HLA-D genes (DRB1 0101, DQA1 0101 and DQB1 0501) are associated with IgE-responsiveness to Chi t I (8).

Eriksson et al. (9) showed that Chironomidae extracts inhibited RAST with shrimp. A cross-allergy might also occur between Chironomids, Mollusca and Crustacea. This relation could also be hypothesized in our case.

We considered it worth while reporting this case since: first, the angioedema feature which occurred in our patient was different from that usually observed in patients with Chironomus. Sensitization to Chironomus is known to occur in the population living in areas with water, where seasonal Chironomidae midges are present, but also among fish breeders, since Chironomidae larvae are frequently used as fish food and that angioedema can be the main symptom for rhinitis and asthma (10, 11). It is therefore important to bear this in mind when observing patients in the allergology department who as owners of a home aquarium reveal that they handle fish food.

REFERENCES

1. Teranishi H, Kawai K, Murakami G, Miyao M, Kasuya M. Occupational allergy to adult chironomid midges among environmental researchers. *Int Arch Allergy Immunol* 1995; 106: 271–277.
2. Kay AB, MacLean U, Wilkinson AH, Gad el Rab MO. The prevalence of asthma and rhinitis in a Sudanese community seasonally exposed to a potent airborne allergen (the “green nimitti” midge, *Cladotanus lewisii*). *J Allergy Clin Immunol* 1983; 71: 345–352.
3. Kagen SL, Yunginger JW, Johnson R. Lake fly allergy: incidence of chironomid sensitivity in an atopic population (abstract 315). *J Allergy Clin Immunol* 1984; 73: 187.
4. Baur X, Liebers V. Insect hemoglobins (Chi t I) of the Diptera family Chironomidae are relevant environmental, occupational, and hobby-related allergens. *Int Arch Occup Environ Health* 1992; 64: 185–188.
5. Brasch J, Brunning H, Paulke E. Allergic contact dermatitis from chironomids. *Contact Dermatitis* 1992; 26/5: 317–320.
6. Kawai K, Konishi K. Fundamental studies on chironomid allergy. II. Analyses of larval allergens of some Japanese Chironomids (Chironomidae, Diptera). *Jpn J Allergol* 1986; 35: 1088–1089.
7. Liebers V, Baur X. Chironomidae haemoglobin Chi t I-characterization of an important inhalant allergen. *Clin Exp Allergy* 1994; 24: 100–108.
8. Tauts C, Rihs HP, Thiele A, Zwollo P, Freidhoff LR, Marsh DG, et al. Association of class II sequences encoding DR1 and DQ5 specificities with hypersensitivity to chironomid allergen Chi t I. *J Allergy Clin Immunol* 1994; 93: 918–925.
9. Eriksson NE, Ryden B, Jonsson P. Hypersensitivity to larvae of chironomids (non-biting midges). Cross-sensitization with crustaceans. *Allergy* 1989; 44/5: 305–310.

10. Liebers V, Baur X. Aquarium-when hobby becomes a danger. A case report. *Fortschr Med* 1991; 109/30: 617–618.
11. Dietschi R, Wuthrich B. "Aquarium" allergy: bronchial asthma caused by polyvalent sensitization to various components in fish food. *Hautarzt* 1987; 38/3: 160–161.

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