

Adverse reactions resulting from skin testing in the diagnosis of red grubs (*Chironomides*) allergy

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Key words: anaphylaxis; *Chironomus*; fish food; red grubs; skin test.

Chironomus larvae seem to be the main allergen in fish food allergy (1). They are commercially known as red grubs or blood worms, and are usually kept deep-frozen or freeze-dried. Hypersensitivity to *Chironomus*

Skin testing with *Chironomus* can result in severe systemic reactions including anaphylaxis.

larvae has been reported to cause urticaria, rhinoconjunctivitis, asthma, angioedema and even anaphylaxis. Skin tests have been primarily used to make the diagnosis. Large immediate as well as delayed skin test reactions have been described (2), but to our knowledge none has been associated with systemic reactions. Here, we report our experience with *Chironomus* skin testing and the associated adverse reactions encountered.

In 2000, a 44-year-old man presented to our clinic with possible reaction to seafood. Upon questioning, he mentioned that he had to stop using red grubs to feed his exotic fishes as because 5 years earlier, he developed progressive symptoms of shortness of breath and wheezing every time he would come in contact with the larvae, frozen or dried. Skin prick tests with fresh seafood and frozen red grubs were done. The skin tests were positive to scallop, mussel and shrimp and the patient presented a significant positive test to red grubs. Five minutes

after the skin tests, the patient developed a violent anaphylactic reaction with urticaria, angioedema, hypotension and loss of consciousness. Thankfully, the event occurred in a hospitalized setting and the reaction was rapidly controlled with 0.5 mg of subcutaneous adrenaline and 50 mg of intravenous diphenhydramine.

In 2001, a 10-year-old girl came to the clinic reporting symptoms of sneezing when feeding her fish with red grubs. Skin prick testing with red grubs resulted in a 35 mm wheal (dilution 1/20) and, more importantly left a significant lymphatic trail along the girl's arm. Despite 25 mg PO of diphenhydramine, the reaction persisted for many hours.

More recently, in November 2006, a 14-year-old girl reported symptoms of urticaria, angioedema and wheezing while in contact with red grubs. Skin tests were initially carried out to common fishes, molluscs and crustaceans. Skin test with red grubs was performed on a following appointment. Almost immediately after skin test with red grubs, the patient complained of generalized pruritus. Fifteen minutes later, despite 50 mg PO of diphenhydramine and 10 mg PO of cetirizine the patient was not relieved but started complaining of dizziness. She was immediately administered 0.3 mg of subcutaneous adrenaline with rapid resolution of her symptoms. The skin test to red grubs was positive with a wheal of 8 mm (dilution 1/20). Those to tuna, trout and oyster were slightly positive (4 mm wheals) but radioallergosorbent tests came out negative and thus the patient was not put on a restrictive diet.

Prick-prick test with *Chironomus* has a very high potency of systemic reaction. Although huge local reactions have already been reported (2, 3), the risk of systemic reaction have to be considered. It is interesting to note the parallel with latex hypersensitivity for which skin testing has previously been associated

with many serious adverse reactions (4, 5). Performance of prick-prick test with *Chironomus* should be done with extreme caution. Undiluted red grubs should be avoided. Prick tests have to be started with a highly diluted solution and progressively increased to obtain the lowest effective concentration. A commercial standardized extract should be studied to ensure the safety and efficacy of skin testing in the diagnosis of red grubs allergy.

In conclusion, we report three cases of patients who developed adverse systemic reactions to skin prick testing with red grubs. *Chironomus* larvae have proven to be a potent allergen. As demonstrated, skin testing with red grubs can result in severe reactions and should therefore be performed only in controlled hospitalized settings.

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Antihistamine and sodium cromoglycate medication for food cold water exercise-induced anaphylaxis

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Key words: food allergy; food exercise-induced anaphylaxis; sodium cromoglycate; wheat allergy.

Food exercise-induced anaphylaxis (FEIA) is an uncommon but well described immunoglobulin (Ig) E-mediated reaction

potentially causing severe anaphylaxis (1) after ingestion of a specific food, most often wheat flour, exclusively when followed by exercise (2).

The patient reported here suffered from FEIA, exclusively when exercising in cold water. He is a 17-year-old man playing national league water-polo, swimming every day for at least 1 h. He was experiencing in the last 2 years monthly anaphylactic reactions ranging from diffuse urticaria to acute asthma when swimming up to 6 h after eating wheat. The reactions appeared in various swimming pools as well as in a lake (water temperature between 18 and 25°C) but not when doing other types of exercise (e.g. running) indoors or outdoors. Oral antihistamines alone failed to prevent the reactions but no reaction occurred on a wheat avoidance diet for 8 h prior to swimming.

His medical history revealed pollen-induced allergic rhinitis. He never suffered from atopic dermatitis, asthma or

Table 1. Food challenge tests (chronological order)

	Without wheat	After wheat
No exercise	No reaction	No reaction
Running	No reaction	No reaction
Swimming in warm water pool (31°C)	No reaction	No reaction
Swimming in cold water pool (24°C)	No reaction	Urticaria and pruritus*
Swimming in cold water pool (24°C) with antihistamine and cromoglycate	NA	No reaction

*Challenge was then stopped, no treatment given, symptoms resolved over 30 min.

any type of physical urticaria, and had no sign of systemic disease.

Skin prick tests showed sensitization to celery, nuts and various pollens (weed, rye and mugwort) and negative results for various cereals including wheat and soy. Serum-specific IgE (by UniCAPTM, Phadia, Uppsala, Sweden) were positive at 0.8 kU/l for wheat, 3.96 kU/l for rye, 1.22 kU/l for barley, 3.67 kU/l for maize and 1.69 kU/l for buckwheat flour. Basal serum tryptase level was normal.

Further diagnostic work-up included food challenges without and with exercise as summarized in Table 1. The challenge tests were conducted in the morning, in a fasting state or 90 min after ingestion of 3.5 g of cooked wheat protein. The patient remained asymptomatic after running 20 min on a treadmill. After ingestion of wheat, the patient developed diffuse pruritus and urticaria on his trunk after 15 min of brisk swimming in the 'cold' swimming pool (24°C). The challenge was stopped and the symptoms resolved spontaneously. Interestingly, no symptoms appeared in the warm swimming pool (31°C) after a similar effort.

Diet was the major drawback for the patient's sport activity. Therefore, a protective treatment with oral antihistamine (fexofenadine, TelfastTM 360 mg, once a day; sanofi-aventis, Geneva, Switzerland) and oral sodium cromoglycate (NalcromTM 200 mg; sanofi-aventis) prior to every meal was started. The efficacy of this treatment was assessed by a negative wheat challenge followed by swimming in the cold water pool. Two weeks later, on protective medicine, the patient was progressively reintroduced to wheat without reaction.

The food and exercise challenge tests demonstrated that our patient suffered from FEAI to wheat but exclusively in cold water with a temperature below

31°C, with a threshold between 25 and 31°C.

Food exercise-induced anaphylaxis is usually manageable with avoidance diet only. However, restrictive diet or exercise avoidance can be difficult and impair quality of life, particularly in athletes.

Cromoglycate, a mast cell stabiliser, was studied earlier in food allergy but failed to be effective in egg allergic patients (3). However, we could show that the addition of antihistamine and cromoglycate abrogated the symptoms, allowing our patient to keep on his high level training programme while eating a nonrestricted diet. This confirms an earlier case report of a successful prevention of FEIA with sodium cromoglycate (4).

Only larger trials could demonstrate if antihistamines combined with sodium cromoglycate could avoid restrictive diet in selected patients with this condition.

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