ANAPHYLAXIS AFTER AN INSECT BITE

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An online version of this case, including CME Assessment Test can be found at:
http://www.eaaci.net/site/content.php?l1=17&sel=400
A 6-year old boy was bitten on two consecutive days by an unidentified insect while playing near a lake. It was a kind of horsefly, sticking to the skin after the bite. The first bite resulted in a local swelling, but within 5 minutes he had generalized itch, erythema, dyspnoea, nausea and dizziness. The GP (general practitioner) was called and after medication (epinephrine, clemastine and prednisolone) was given the symptoms disappeared completely.

The second day after another bite on his leg, he experienced within 5 minutes generalized urticaria and dyspnoea.

The GP diagnosed anaphylaxis and treated him accordingly with epinephrine, clemastine and prednisolone. He was prescribed an epinephrine auto injector 0.15 mg (body weight was at that time 20 kg).

Before these episodes he was stung and bitten by several insects with only a local reaction. There was a history of atopy, a mild rhinoconjunctivitis and bronchial wheezing due to an allergy to house dust mites and pets (confirmed by RAST). For this he was seen by a pulmonologist and he was treated with budesonide inhalation (2 x 400 microgram, continuously).

The patient was referred to our clinic 3 months later. At that time we saw a healthy boy, normal auscultation of the lungs and no signs of urticaria pigmentosa (as a clue for increased number of mast cells, or mastocytosis).

Serologic investigation is summarized in Table 1.

**Table 1. Serologic determinations (Pharmacia BV, Uppsala, Sweden)**

<table>
<thead>
<tr>
<th></th>
<th>Tryptase</th>
<th>Total IgE</th>
<th>Honey bee (Apis mellifera)</th>
<th>ImmunoCAP i1</th>
<th>Common wasp (Vespula spp.)</th>
<th>ImmunoCAP i3</th>
<th>Horse fly (Tabanus spp.)</th>
<th>ImmunoCAP i204</th>
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<tbody>
<tr>
<td></td>
<td>3.9 ug/L</td>
<td>290 E/ml</td>
<td>&lt; 0.35 kU/L</td>
<td></td>
<td>1.35 kU/L</td>
<td></td>
<td>&lt; 0.35 kU/L</td>
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The next summer the clegs were collected in the field by neighbours and family members. The insects were identified by an entomologist as species *Haematopota pluvialis* (Dr. Brugge, University of Amsterdam, Institute for Toxonomic Zoology). Insects were frozen and stored at –20° C. Proteins were extracted in phosphate buffered saline (PBS), filtered and coupled to CyanogenBromid (CNBr)-activated sepharose. Cleg-sepharose is incubated with serum from the patient overnight. As controls three sera from atopic patients with a corresponding total IgE value were used. After washing, % bound IgE directed to *Haematopota* is detected with labelled anti-human IgE antibodies. In the patient a high amount of specific IgE directed to the cleg was found (see also Figure 1.) There was no non-specific binding in the control sera, nor binding in the absence of sera (background).

In this way we confirmed the diagnosis: IgE-mediated anaphylaxis to clegs (*Haematopota* ...
pluvialis). In August the boy experienced again an anaphylactic reaction after bits from 4 clegs, while playing near the lake. The epinephrine auto injector was used adequately by the parents and he was admitted to the hospital for observation.

During vacation in Spain the boy got bitten by mosquitos with no direct complaints apart from local itch and minor swelling. After several days he suffered from general discomfort, fatigue, nausea, abdominal pain, fever and the biting sites show redness and painful swelling. He was treated by the local doctor with fucidin ointment, lidocaine ointment and antibiotics (fluclouxacinilin), for a few days before returning home. After his return to the Netherlands they visit our department because of clinical deterioration (again fever, headache and gastrointestinal complaints) and similar milder complaints from his two brothers. On dermatologic examination we see multiple erythemosquamous eruptions, with sharp borders, yellowish colored with crustae and excoriations.

The diagnosis was Impetigo Crustosa and he was treated successfully with clarithromycin tablets for ten days, sulphur/zinc ointment and povidone-iodine shampoo. His brothers are treated with fluclouxacinilin only, because of a suspicion of a milder, starting infection.

**DISCUSSION**

The family of *Tabanidae* are 5-30 mm long insects with two wings and antenna. The cleg is one of the tiniest member of the family, 8-12 mm long and the flies have a grey-black appearance (Figure 2). Other genus of the *Tabanidae* family are *Chrysops* and *Tabanus* spp (Table 2, see also http://www.roberth.u-net.com/horseflies.htm). Only female insects sting or bite. *Haematopota* species are able to approach their victim without noise, undetected and to settle upon exposed parts of the body without being felt, until the proboscis pierces the skin. A faint hum can usually be detected from *Chrysops* females as they draw close to their favourite point of attack i.e. the back of the head or neck. They settle on clothing and stealthily make their way to a place where they may sting. The clegs usually attack during late afternoon and they are very active in rainy weather of thunderstorm (the Dutch call them “regendaas” i.e. “rainfly”). Their habitat is in humid places like lakes and swamps.

Figure 2.
After bites of flies, clegs and mosquitos usually there appears a local reaction with itch, redness and swelling. In the literature rare cases are found with severe systemic reactions after these bites, occurring more often after stings from Hymenoptera spp [1-5]. Insect allergen extracts for diagnostic work-up are not commercially available. Some investigators succeed in diagnosing the IgE mediated reaction by using homemade allergen extracts [1,3,5]. Also in this case, the UniCAP used concerned another genus of the Diptera (Tabanus), apparently not cross-reactive with the genus Haematopota. By using homemade extracts of clegs collected in the neighbourhood of the patient, we were able to detect the IgE antibodies responsible for the anaphylaxis. As treatment we considered immunotherapy with whole body extract or purified extract from the salivary glands of the insects [2-4]. However, due to the low number of patients, we will not find an allergen extract manufacturer eager to produce this kind of treatment [6].
References


Summary

We describe a rare case of anaphylaxis after bites of a cleg, endemic for the southeast of the Netherlands. It concerns a 6-year old boy with several occasions of anaphylactic reactions, the responsible insect identified as Haematopota pluvialis. These insects are biting insects of the order Diptera, family Tabanidae (“horseflies”) The IgE-mediated reaction was confirmed using sepharose-coupled whole body extract of captured insects. As there is no commercially available extract for immunotherapy, the only treatment consisted of avoidance and first aid medication (an Epipen® auto injector) in case of accidental bites.

Keywords: anaphylaxis, insects, RAST, immunotherapy
Assessment test

1. What is the drug of choice in case of a moderate to severe anaphylactic reaction in a 6-year old boy?
   a. clemastine i.m.
   b. prednisolon i.m.
   c. epinephrine 0,3 mg via Epipen auto-injector®
   d. epinephrine 0,15 mg via Epipen auto-injector jr®.

2. To which genus belongs the described cleg?
   a. genus Tabanus
   b. genus Haematopota
   c. genus Chrysops
   d. genus Vespa

3. If you were an allergen manufacturer, how would you produce an extract for immunotherapy for this boy?
   a. purified whole body extract of any species belonging to the Tabanidae
   b. purified whole body extract of the species Haematopota pluvialis
   c. isolated and purified extract of the salivary glands of the species Haematopota pluvialis

4. Which advice would you give the parents of the boy, as there is no immunotherapy option possible?
   a. always carry an epinephrine autoinjector jr
   b. move to another part of the Netherlands where the insects are not common
   c. start immunotherapy with a common available Hymenopeta venomextract
   d. start immunotherapy with purified whole body extract from Solenopsis

5. What is the optimal treatment in case of Impetigo Crustosa after an insect bite or sting?
   a. antihistamines
   b. NSAID’s
   c. antibiotics
   d. antibiotics and local treatment of the skin