Brief communications

Anaphylactic reaction after bites by *Glossina morsitans* (tsetse fly) in a laboratory worker

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CASE REPORT

A 32-year-old doctoral student was first seen with a history of an anaphylactic reaction after three bites by a tsetse fly, occurring during his laboratory work with the tsetse fly. With the third bite he was able to kill the insect, and after examination, no blood was found in the insect. After 10 minutes, he experienced local itching and a warm feeling, which extended to both hands. After 15 minutes, redness and slight swelling of the hands appeared. Twenty minutes after the bites, urticarial plaques appeared, first on his face and later over the entire body. He sensed palpitations and felt presyncopal. He immediately received an intravenous injection of a corticosteroid preparation. He subsequently recovered without further symptoms.

He had worked for 6 years with *Glossina* spp., the first 4 years with *G. palpalis gambiensis* and the last 2 years with *G. morsitans morsitans*. The insects causing the bites were not infected with *Trypanosoma* species. In the first year of his work he let uninfected *G. palpalis* insects bite his ankle daily for 2 months in order to feed them. He never experienced side effects during this period. Later, he received monthly accidental bites but without any significant reaction. He had a history of rhinitis and sinusitis at the age of 7 years and had been treated with a hyposensitization extract containing house dust mite and cat and dog dander. He had no history of latex anaphylaxis. At our clinical evaluation 8 days after the incident, no residual signs or symptoms were present. Results of skin tests were negative for a panel of inhalant and food allergens. Results of blood sedimentation and C-reactive protein were negative. There were 120 eosinophils per microliter. Routine biochemical evaluation was normal. Immunoglobulin levels and complement factors were normal. C1-esterase inhibitor was normal; cryoglobulins and immune complexes were negative. Total serum IgE was 140 kU/L, and determinations of specific IgE (Pharmacia CAP system; Kabi Pharmacia, Brussels, Belgium) to common inhalant allergens (fish, milk, and egg white) were negative.

Abbreviation used
PBS: Phosphate-buffered saline

METHODS

To confirm the presumptive diagnosis of IgE-mediated anaphylaxis to tsetse fly, specific IgE was determined against salivary glands of *Glossina* spp. by means of a dot blot technique. Salivary glands of teneral flies of two tsetse species, *G. palpalis gambiensis* and *G. morsitans morsitans*, were carefully removed according to the method of Penchenier and Itard.[1] The glands were washed in ice-cold phosphate-buffered saline (PBS) (20 mmol/L, pH 7.2) and stored at −70° C until use. For each species, 100 pairs of salivary glands were pooled.

The glands were mixed vigorously, and a twofold dilution was made in PBS. Five microliters was spotted on nitrocellulose (Schleicher and Schuell, Dassel, Germany) and allowed to dry. After blocking with 10% nonfat dry milk in PBS for 1 hour, serum was added and incubated overnight at room temperature. Dot blots were washed three times in PBS with 0.1% Tween-20 and incubated for 3 hours with anti-human IgE, labeled with peroxidase (DPC, Los Angeles, Calif.). After washing with PBS–Tween-20, detection of bound enzyme conjugate was done with hydrogen peroxide and 4-chloro-1-naphtol as substrate. To check the specificity of the anti-IgE antiserum, house dust mite extract (*Dermatophagoides pteronyssinus*; Haarlem Allergen Laboratories, Brussels, Belgium, 1 mg/ml) was also blotted in a similar way as the *Glossina* extracts. Sera of two patients with specific IgE to house dust mite, as determined by the CAP and skin prick tests, were incubated with this blotted antigen and proved positive.

As negative controls, sera of seven healthy individuals never exposed to *Glossina* spp., free of any disease, and without past or present symptoms of allergy were also examined. To estimate the frequency of the presence of specific IgE antibodies to *Glossina* spp. in individuals exposed to the insect in natural or laboratory conditions, serum samples from five individuals, working in the same institute, were also investigated. All of these individuals were bitten at least once, and none of them ever had symptoms of anaphylaxis after bites. Four of the five were allergic to inhalant allergens. Our patient's

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J Allergy Clin Immunol 1996;98:700-1.

0091-6749/96 $5.00 + 0 1/54/74345

serum reacted with both salivary gland extracts, whereas no reaction was observed with the negative control sera. One of the five exposed individuals had a positive reaction to both *Glossina* extracts. He was highly allergic to a number of different dander extracts. He was bitten four times by *Glossina* insects but never experienced any reaction.

DISCUSSION

Anaphylactic reactions to stinging insects are well known. In particular, stings by Hymenoptera species and imported fire ants can give rise to life-threatening reactions. Mosquito bites can induce immediate, late, or dual local reactions.[2] IgE is thought to be involved in a number of these reactions.[3] Flies, belonging to the order Simuliidae, may induce large local reactions after a painful bite.[4] To our knowledge, anaphylactic reactions to *Glossina* spp. have not yet been reported. We could demonstrate the involvement of IgE through a positive blotting to a salivary gland extract. Nevertheless, the sole presence of specific IgE to *Glossina* does not predict clinical symptoms, since we could demonstrate a positive blot result in one allergic individual bitten by *Glossina*, who never showed symptoms after bites. Because our patient never traveled to an endemic area, sensitization must have occurred through his laboratory contacts with the fly. No specific measures can be taken to avoid this reaction.

REFERENCES

1. Penchenier L, Itard J. Une nouvelle technique de dissection rapide des glandes salivaires et de l'intestin des glossines. Cah O.R.S.T.O.M., Séries Entomologie Médicale et Parasitologique 1981;19:55-7.
2. Oka K, Ohtaki N. Clinical observations of mosquito bite reactions in man: a survey of the relationship between age and bite reaction. J Dermatol 1989;16:212-9.
3. Brummer-Korvenkontio H, Lappalainen P, Reunala T, Palosuo T. Detection of mosquito saliva–specific IgE and IgG_4 antibodies by immunoblotting. J Allergy Clin Immunol 1994;93:551-5.
4. Fünfstück V, Hertel W, Schulze H. Simuliosis—Dermatose durch Kriebelmücken. Dermatol Mon Schr 1989;175:499-503.