

Case report

Anaphylaxis to *Hippobosca equina* (louse fly)

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Background: IgE-mediated allergy to insects different from *Hymenoptera* species is seldom reported.

Objective: To describe and study the case of a previously nonatopic man with an anaphylactic reaction (grade III, Müller) caused by a bite from a louse fly (*Hippobosca equina*).

Methods: In vivo (skin prick tests) and in vitro (enzyme-linked immunosorbent assay and sodium dodecyl sulfate–polyacrylamide gel electrophoresis immunoblotting) tests were used for diagnosis. Cross-reactivity between *H equina* and different insects was investigated.

Results: Results of skin prick tests and serum specific IgE were positive to *H equina*. Immunoblot inhibition studies identified common bands in *H equina*, *Apis mellifera*, and *Musca domestica*, but this cross-reactivity did not affect a band of 16 or 15 kDa. This molecular weight is similar to that of phospholipase A2 in *A mellifera* venom.

Conclusion: We describe a case of IgE-mediated allergy to *H equina* in which specific molecular band proteins seemed to be responsible for the reaction.

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INTRODUCTION

Hippoboscidae, or “louse flies,” are winged insects belonging to the Diptera order that can serve as vectors of infectious diseases to mammals, humans among them.¹ *Hippobosca equina*, commonly known as “horse tick” or “horsefly” in English, “Hippobosque du cheval” or “Mouche-araignée” in French, and “mosca borriquera” in Spanish, is a hematophage 2-winged fly that parasitizes horses, cows, and sheep in southern Europe (Fig 1). Bites from louse flies can be particularly painful because of the presence of mandible-like tiny serrated scimitars. However, these bites rarely inflict an allergic reaction in humans.² A case of an anaphylactic reaction (grade III, Müller) to a *H equina* bite in which an IgE mechanism has been demonstrated is presented.

CASE REPORT

A 54-year-old man with no previous history of atopy experienced a generalized reaction after being bitten by a single “louse fly.” The patient lives in a rural area. He was retired from work because of poor health, but he took care of his animals (sheep) at his farm. He had been diagnosed as having ischemic cardiopathy and was being treated with the β -blocker atenolol. He had a history of large local reactions after stings from bees and bites from what he called “animal

flies.” In July 2005, while working with sheep, he was bitten by one of these animal flies. Fifteen minutes later he developed generalized pruritus, followed shortly by generalized urticaria, palpebral and labial edema, dyspnea, and hypotension (blood pressure, 80/60 mm Hg). He required medical assistance and was treated intravenously with chlorphenamine (5 mg), methylprednisolone (40 mg), and oxygen at the emergency unit of a primary care center. He was transported to the nearest hospital, where skin lesions were still evident. Total recovery was achieved 3 hours later.

The patient was seen at the Allergy Service of Complejo Hospitalario Universitario de Santiago 1 month later in stable condition. He had captured the culprit insect, which was recognized by an entomologist as *H equina*. Results of skin prick tests with common inhalants, commercial extracts of *Apis mellifera* venom, whole-body extracts from *Tabanus* species, and *Culex pipiens* (Bial-Aristegui, Bilbao, Spain) were negative. Results of intradermal tests with *A mellifera* venom were positive at 1 mg/mL. Results of a skin prick test with a whole-body extract (5 mg/mL) prepared from samples of *H equina* provided by the patient were positive (12 $\times$ 8 mm) (Fig 2). Twenty control subjects were tested with the same extract and had negative results. The total serum IgE level was 169 kU/L. Positive specific IgE results were obtained against *H equina* (2.3 kU/L, using the enzyme allergosorbent test method) and *A mellifera* (1.08 kU/L, using the CAP System; Pharmacia, Uppsala, Sweden). No specific IgE was detected against *Musca domestica*, *Drosophila melanogaster*, *Aedes* species, *C pipiens*, *Tabanus* species, and venoms from *Vespa* species and *Polistes* species. IgE immunoblotting of *H equina* after sodium dodecyl sulfate–polyacrylamide gel electrophoresis in the presence of

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Figure 1. *Hippobosca equina*.

2-mercaptoethanol revealed at least 9 protein components able to bind specific IgE, with molecular masses ranging from 16.5 to 120 kDa. Some IgE-binding bands with similar molecular weights were detected in IgE blotting with *M domestica* and *A mellifera* venom extracts. Except for non-specific binding to a band of approximately 21 kDa found in the 3 extracts that persisted after inhibition assays and 2 bands of approximately 15 and 16 kDa, all IgE-binding bands disappeared when *M domestica* and *A mellifera* venom extracts were used as inhibitors (Fig 3).

DISCUSSION

Reports of systemic allergic reactions after Tabanidae insect (known as "horseflies") bites are common, and some degree of cross-reactivity between proteins from them and those from *Vespula* species venom has been reported.^{3,4} In contrast, we could find only 1 case in which a supposedly systemic allergic reaction was related to a *H equina* bite, but no immunologic study was performed in that case.²

The possible role of *A mellifera* as the first sensitized agent in the anaphylactic reaction to the *H equina* bite experienced by the patient has been raised. In fact, immunoblot inhibition assays with *A mellifera* venom were considered to determine whether it would be worth a trial with specific immunotherapy with this venom to protect the patient against future bites

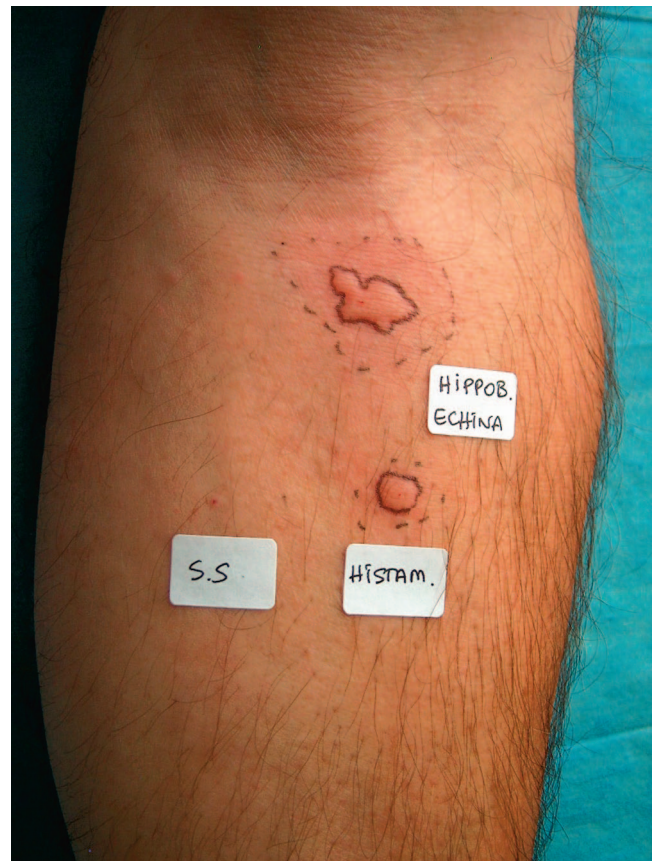


Figure 2. Results of a skin prick test with the extract of *Hippobosca equina*.

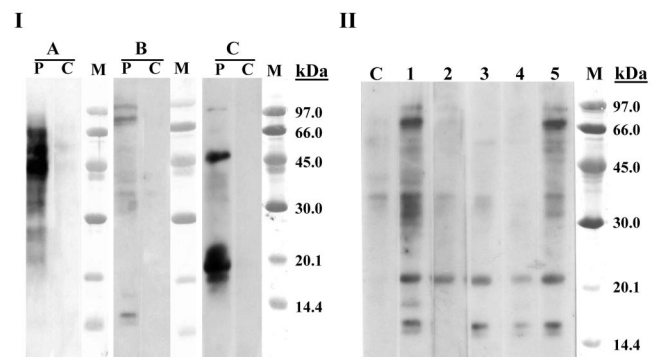


Figure 3. Cross-reactivity between *Hippobosca equina* and *Musca domestica* and *Apis mellifera* venom was detected. I, Sodium dodecyl sulfate-polyacrylamide gel electrophoresis immunoblot results using extracts from *M domestica* (A), *H equina* (B), and *A mellifera* venom (C). Lane P shows patient serum; lane C, control serum (pool of serum from nonatopic subjects); and lane M, molecular weight standard. II, IgE immunoblot inhibition results. Lane C shows control serum; and lane M, molecular weight standard. The other lines were assayed with patient serum (lane 1) and with this serum previously incubated with extracts from *H equina* (lane 2), *M domestica* (lane 3), *A mellifera* venom (lane 4), and lamb meat (lane 5).

from *H equina*. Thus, most of the IgE molecular bands in *H equina* disappear with inhibition assays using *M domestica* and *A mellifera* venom extracts as inhibitors. However, the lack of inhibition at the IgE-binding bands of 15- and 16-kDa band binding led us to conclude that there is no relevant cross-reaction between *H equina* and *A mellifera* venom because it is well known that one of the main allergens of *A mellifera* venom is phospholipase A2, a 16-kDa protein.⁵ In this setting, the protective effect of immunotherapy with *A mellifera* venom is unknown and could lead to undesirable adverse effects. More advances are needed in the immunologic approach to insect allergy different from that secondary to *Hymenoptera* species to give a more specific and high-quality solution to this group of patients.

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