Bull. Soc. Pathol. Exot. (2010) 103:309-312
DOI 10.1007/s13149-010-0094-4

CLINICS / *CLINIQUE*

Local intense and systemic reactions to *Aedes albopictus* (Diptera, Culicidae) bites: a clinical case report

Réactions locales intenses et systémiques à des piqûres d'*Aedes albopictus* : compte rendu de cas clinique

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Revised: 18 February 2010; accepted: 27 July 2010

Abstract We present here our experience with a 34-year-old woman living in the province of Cuneo in northwest Italy. The patient had no prior allergic disease history and in the place of bite by *Aedes albopictus*, she sustained significant reactions (ecchymosis), along with fever and localized lymphadenopathy. Thirty days later, the bites were still visible, characterized by cutaneous thickening and localized paresthesia. This clinical case represents a hypersensitive reaction and can be considered the first documented case of Skeeter syndrome in Italy. ***To cite this journal: Bull. Soc. Pathol. Exot. 103 (2010).***

Keywords *Aedes albopictus* · Allergy · Skeeter syndrome · Cuneo · Italy · Europe

Résumé Dans cette note, nous présentons le cas d'une femme de 34 ans originaire de la province de Cuneo, dans le nord-ouest de l'Italie. La malade n'a aucune allergie préalable et présente des réactions significatives (ecchymoses) aux sites où elle a été piquée par *Aedes albopictus*, associées à de la fièvre et à une lymphadénopathie localisée. Trente jours plus tard, les piqûres étaient encore apparentes, caractérisées par un épaississement cutané et une paresthésie localisée. Cette présentation clinique représente une réaction d'hypersensibilité et peut être considérée comme le premier cas de syndrome de Skeeter documenté en Italie. ***Pour citer cette revue : Bull. Soc. Pathol. Exot. 103 (2010).***

Mots clés *Aedes albopictus* · Allergie · Syndrome de Skeeter · Cuneo · Italie · Europe

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Introduction

Aedes albopictus (Skuse, 1897), commonly known as the tiger mosquito, first appeared in Italy in 1990 in Genoa, and in 1991 in Padua, following the importation of worn out tires. In subsequent years, its habitat has continually spread and it is now found in most parts of the country [15,16].

The tiger mosquito readily preys on humans and tends to feed during the day. Compared to endemic mosquitoes, it represents a public health concern most notably as a vector of arbovirus [14,16], as well as for the dermatological implications of its bites.

Bites of indigenous mosquitoes, primarily *Culex pipiens* (Linné, 1758) and *Aedes communis* (De Geer, 1776), result in itchy red swollen lesions caused by the anesthetizing, anticoagulating, and reddening agents (Lewis's triple response) present in the insect's saliva. The lesions generally subside within a few days except in cases of hypersensitivity which can be immediate or delayed. Type I hypersensitivity generally results in extended topical reactions [4], while in rare cases, severe systemic reactions emerge [6,7,10].

Compared to those of indigenous mosquitoes, bites of *Aedes albopictus* cause lesions and symptoms which are more intense, attenuate more slowly [13], and can result in further infection. Most Type I hypersensitivity reactions are caused by bites of the tiger mosquito [11].

Presented below is the description and analysis of a case where multiple sustained bites resulted in systemic reactions and which, despite pharmacological treatment, were still significantly visible one month later.

Case report

On July 17, 2009, a 34-year old woman living in northwest Italy, with no prior history of allergies and no other evident pathologies came to the emergency department (ED) of the Santa Croce Hospital in Cuneo, following the advice of her family physician who had requested further examination of lesions on the patient's legs presumably caused by an insect (Figs. 1,2). Her vital signs were within normal ranges (BP: 122/77 mmHg; HR: 95/min; SaO_2: 97%; ear temperature: 36.4 °C).

Fig. 1 Skin lesions on the left inferior limb upon arrival at the emergency department of the Cuneo hospital. In both lesions, penetration by the proboscis of *Aedes albopictus* is clearly visible. The comet sign is evident (Photo M. Dutto, All Rights Reserved)

Fig. 2 Skin lesions to the left inferior limb upon arrival at the emergency department of the Cuneo hospital. In both lesions penetration by the proboscis of *Aedes albopictus* is clearly visible (Photo M. Dutto, All Rights Reserved)

All the lesions were on the patient's legs: four on the right and three on the left; the bites on the right leg were not as significant. Two of the bites on the left leg were pretibial and the other was on the lateral malleolus. All lesions had a diameter greater than 30 mm, were ecchymotic, and were painful to the touch with a visible mark in the center attributable to the penetration of an insect's proboscis. One lesion had comet sign (Fig. 1).

The case history indicates that on July 7, 2009 during routine gardening activities in the evening (5:30–6:00 pm), the patient sustained a series of bites or stings initially characterized by stinging and intense burning sensations, and later that evening itching and edema, which in the left leg extended as far the knee. The following evening (July 8), the patient's left leg was sore and stiff with throbbing associated with a slight fever (37.9 °C axillary). On July 9, the patient went to the ED at her local hospital, apyretic but with the entire left leg characterized by a rash and swelling in conjunction with inguinal lymphadenopathy. The diagnosis was unidentified insect bites and the patient was advised to apply an antibiotic ointment once daily (gentamicin 0.1%) and was dismissed. By July 12, the swelling had subsided and the lesions were ecchymotic, yet still persistent and a source of worry for her family physician. The patient history further indicates that prior to this episode, she had been bitten by mosquitoes in the evening or night but the reaction was always limited to simple itchy red swelling which diminished rapidly (6–8 hours).

At the hospital in Cuneo, the patient was diagnosed as having been bitten by a hematophagous insect, possibly *Aedes albopictus*, and the local health services were contacted to confirm its presence in the region. The patient was given a further antibiotic treatment (amoxicillin 1 g/day, 6 days), along with antihistamines (cetirizine 10 mg/day, 5–6 days) and steroids (betamethasone 1 mg/day, 3 days).

On July 19, at approximately 6:30 pm, the patient discovered a new bite on her lower right leg near the ankle; the insect was captured and sent to an entomologist at the hospital in Cuneo who ascertained that it was *Aedes albopictus*. As clinically expected, the bite became swollen, accompanied by itching and burning lasting several days.

On August 20, a medical-entomology investigation was set up, placing egg traps in the area of the patient's home; one week later, the traps were analyzed and confirmed the presence of *Aedes albopictus*.

Examination of the original lesions on August 28 showed that they were still detectable due to cutaneous thickening and localized paresthesia.

Discussion

Our case represents a hypersensitive reaction and in particular the first documented case of Skeeter syndrome in

Italy. Skeeter syndrome is an allergy-based pathology which develops in reaction to mosquito bites and is characterized by severe extended swelling (local large reaction) and brief fever [17].

From a diagnostic point of view, this typology is often confused with infectious pathologies such as cellulitis and is treated almost without fail with antibiotics despite the fact that in many cases, the clinical developments of Skeeter syndrome are different from those of a bacterial infection.

Indeed, in most cases, ecchymosis is an aftermath to intense localized inflammation with the significant release of chemical mediators of the swelling and the resulting cytotoxicity.

Current allergological diagnosis is not easy due to the lack of purified and standardized recombinant salivary allergenic preparations of the various species which would provide reliable in vivo and in vitro allergy diagnoses [8,18].

In the literature, lesions with the comet sign are identified as a typical reaction to bites of *Pyemotes ventricosus* [3], a mite which is a parasite of furniture beetles (prevalently, *Anobium*). *Pyemotes ventricosus* can also prey on humans, at home and (albeit, rarely) outdoors when humans come into contact with infested wood in nature [3,12]. In the case of our patient's *Aedes albopictus* bites, the lesions could not be attributed to the *Pyemotes ventricosus* mite since the patient clearly identified that the bites occurred in her garden, a space completely devoid of wood infested with the *Anobium* beetle. Furthermore, the rapid onset of her symptoms (itchy swollen red lesions) helped exclude bites of *Pyemotes ventricosus* since these usually appear 12–24 hours after the bite [12].

Management of patients with hypersensitive reactions to mosquito bites is based on:

- bite prevention;
- post-exposure symptomatic treatment;
- and specific immunotherapy.

Prevention is surely the most effective method since it promotes action upon the inductive causes of the pathological process. Pharmacological treatment is useless in managing allergic subjects as it works exclusively on the ectoparasitic effects.

Bite prevention must be effected through use of topical insect repellents applied to exposed skin and on clothing. Clothing should also be treated since, especially in summer, mosquitoes can bite through lightweight garments. Among the recommended insect repellent, active ingredients are DEET (30%) and icaridin (> 20%); vegetable-based repellents are best avoided because of their short-term protection [5]. These products must be applied just prior to being in an infested area, and it is important to take into consideration that the length of time a given product is effective can vary depending on humidity, air temperature, and perspiration; protection can be reduced by as much as 50% necessitating several product applications over 24 hours. Subjects who are particularly exposed and therefore at high risk for bites may opt to use combined, high-level protection in the form of permethrin-impregnated clothing, in addition to spraying exposed parts of the body with the repellents cited above.

Antihistamines are the most effective post-exposure treatment; cetirizine seems to provide the best results [9]. Subjects with significant allergic reactions must be carefully evaluated and taught to quickly recognize signs and symptoms of the more severe systemic anaphylactic reactions which can occur following a mosquito bite. Furthermore, subjects who develop significant allergic reactions or severe anaphylactic reactions would be candidates for specific immunotherapy [10] which, however, is still limited in application due the scarce market availability of standardized recombinant salivary antigenic preparations. Currently, extemporary whole-organism preparations are used. Specific immunotherapy, though it requires several months of treatment, drastically reduces post-trauma procedures and the administering of medicines [1].

More severe clinical reactions to mosquito bites often emerge in cases where the human population is exposed to new indigenous species, or as the result of reactions sustained while visiting an area with mosquito species different from the country of origin.

Despite the fact that most bites of *Aedes albopictus* cause limited-sized red itchy swollen lesions, our case demonstrates once again the medical relevance of this species and that, in zones where it has established itself, it represents a significant threat to the quality of life [2].

Finally, it is worth noting the importance of the relationship between physicians and medical entomologists: the latter can rapidly recognize the cause of a bite by analyzing it together with the patient history and is well-informed on the pathogenesis of lesions caused by arthropods and the attendant therapeutical procedures.

Conflit d'intérêt : aucun.

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