

Severe human urticaria produced by ant (*Odontomachus bauri*, Emery 1892) (Hymenoptera: Formicidae) venom

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Abstract

Background Ant sting reactions are becoming an increasing problem in tropical countries. It is important for physicians to be aware of their possible cutaneous and systemic manifestations.

Methods A child with a severe allergic reaction to an ant sting was examined and is discussed. This is the first case described in the literature caused by the ant *Odontomachus bauri*, and the biology of the ant and the clinical signs in the patient are described.

Results A child developed a strong allergic reaction to an ant sting. The case was not associated with a previous ant sting. Treatment with the systemic antihistamine loratadine (Claritin®) was favorable in this patient.

Conclusions In tropical areas, ant stings are usually benign, self-limited pathologic processes. In some cases, however, severe allergic reactions can develop, including urticaria and anaphylactic shock. Physicians should be aware of the possible complications of ant stings.

Introduction

The ant has become a significant health risk in tropical and subtropical countries, with large numbers of inhabitants of these areas being stung each year.^{1,2} When the nests of *Odontomachus bauri* are disturbed, ants attack their aggressors, stinging them. In most cases, these attacks cause acute pain and slight edema at the site of the sting, but these symptoms disappear in a few hours; only rarely do lethal accidents occur. With different species of ant,³ reactions can range from moderate to extensive local allergic reactions, systemic hypersensitivity, anaphylactic shock, and death.⁴ In this work, we describe a case of widespread urticaria caused by an ant (*Odontomachus bauri*) sting, during its winged period at the mating stage.

Case report

In June 2000, during a rainy day in Caracas, Venezuela, an 8-year-old girl was stung on the middle finger of the right hand by a flying ant whilst playing in the garden. After about 1 min, the girl complained of a burning sensation and itchiness, followed by the appearance of erythematous, pruriginous lesions. The patient was brought to us 6 h after the stinging episode, presenting with erythematous, papular, pruriginous lesions on the arm, hands, posterior trunk, covering nearly all of the skin in the pectoral region (Figs 1–3), and foot. The lesions evolved to intensely pruriginous papules

with a duration of approximately 1 week. The patient developed eosinophilia that resolved without specific therapy. She recovered completely with healing of skin urticaria and normalization of blood counts. The systemic antihistamine loratadine (Claritin®) was used for treatment.

The identification of *Odontomachus bauri* was performed at the Medical Entomology Section of the Tropical Medicine Institute of the Universidad Central de Venezuela.

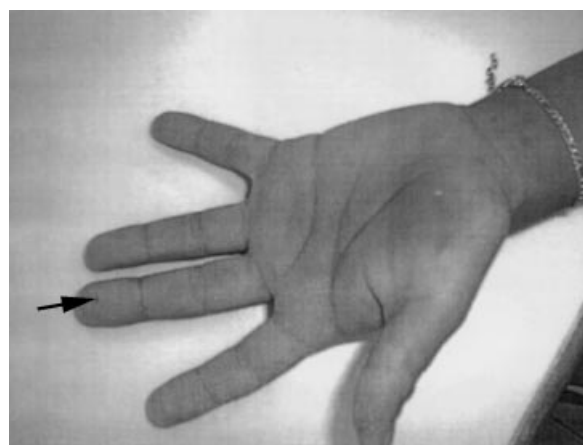


Figure 1 Right hand with reddish-purple-colored maculopapular lesion on the palm. Arrow shows area of puncture

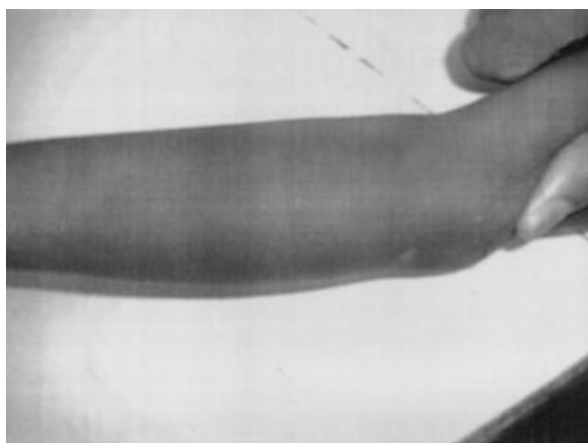


Figure 2 Right arm with reddish-blue maculopapular lesion on the antecubium

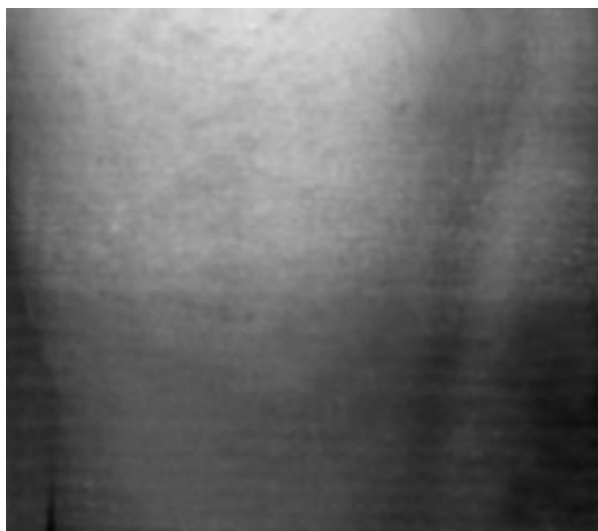


Figure 3 Dorsal thoracic wall with disseminated reddish maculopapular lesions

Discussion

There are many species of Formicidae with venom-inoculating tools of different scales of complexity and toxicity.⁵ One particular ant, *Odontomachus bauri*, has a wide distribution in South and Central America, including Costa Rica, Galapagos Islands, and West Indies, but not Cuba and the Bahamas, especially around tropical forests.⁶ In Venezuela, *O. bauri* is widely distributed, and can be found in tropical forests and gardens. This species was described as *Odontomachus haematodus* var *pubescens* Roger (1861)⁷ from La Guaira, Venezuela.

The ant *O. bauri* usually nests on the ground, preferring sites protected from direct sunlight and where the likelihood of disturbance by natural processes is reduced. The ground is

usually soft and humid. In Venezuela, it is common to observe ants' nests under rocks, branches, and the trunks of fallen trees in the forests. They are also frequently encountered in gardens under rocks, plant containers, and vegetable residues accumulated over relatively long periods of time.

Throughout its range, *O. bauri* often extends further than other Neotropical species into seasonally dry or semiarid habitats.⁵

Located at the end of the gaster is the ant's sting and its accompanying sheath. The ant is capable of extending the sting and injecting a mixture of formic acid and proteins. It is this sting, in conjunction with the mandibles, that is used to discharge the ant bite. Unlike the sting of a bee, the ant's sting is not barbed and can therefore be retracted to be used again. *O. bauri* stings are not usually multiple because they do not attack en masse.

The aggressive behavior of *O. bauri*, as with other species of ant, is a defense mechanism when the nest is disturbed. At the domestic level, this happens by accident during cleaning and gardening in infrequently disturbed areas. Contrary to other species of ant, however, e.g. those belonging to the genus *Solenopsis*, where several dozens of individuals attack in a simultaneous action,⁸ *O. bauri* is characterized by the reduced participation of a few individuals. This characteristic is typical of the genus *Odontomachus*, which from an evolutionary viewpoint contains more primitive ant species. The absence of efficient interspecific mechanisms of communication, which allow ant species from the genus *Solenopsis*⁸ to respond as a colony, may also be involved.

Massive allergic reactions produced by *Odontomachus* stings are infrequent,³ but have been described with the genus *Solenopsis*.⁹

Ants cause envenomation by the injection of a formic acid–protein substance that is part of the “alarm and defense social system” of these insects. In the genus *Odontomachus*, during coupling flight, ants are particularly aggressive and the venom may have a high toxic activity. It is believed that sensitizing proteins are responsible for allergic reactions, as well as formic acid which acts as a hapten.³

In the present case, the patient had no past history of ant stings. Her evolution was rapid and intense, beginning with a typical ant sting, but with a massive allergic reaction that affected the skin. In the physical examination, we did not detect breathing symptoms. The patient's parents were made aware that further contact with these ants could cause a more serious anaphylactic clinical picture. In our experience, victims show an immediate burning reaction at the site of the sting, which usually disappears within 1 h; the lesion evolves into a macule, papule, or thin superficial vesicle surrounded by intense erythema. In the present case, the patient showed an extensive allergic reaction, consisting of spreading urticaria (hands, arms, thorax, and foot) and swelling of the eyelids. The lesions were very itchy and lasted for 1 week. It has been

estimated that 16% of ant stings produce some degree of systemic reaction, with around 0.6–2% causing life-threatening anaphylaxis.^{8,10}

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