

Prevalence of severe ant-venom allergy in southeastern Australia

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Ants of the genus *Myrmecia* (order Hymenoptera) are widely distributed in Australia, being represented by no fewer than 89 species. One species, *Myrmecia pilosula* (known as the jumper ant), is responsible for the great majority of allergic reactions. These are aggressive ants that received their common name because of their ability to jump significant distances when attacking. Jumper ants are found in sandy or mountainous areas of southeastern Australia and Tasmania. Much of this range is shared with *Myrmecia pyriformis*, the bull ant, which is distinguishable from the jumper ant by its larger size (25 mm) and darker color. Bull-ant stings are also allergenic, although the extent of cross-reactivity between the venoms of different species of *Myrmecia* has not yet been fully delineated.^{1,2}

Recently, a jumper ant-sting register identified 224 patients who reported 454 separate sting episodes.³ These stings caused life-threatening reactions in 53% of cases.

The prevalence of allergic reactions to ant venom in Australia is unknown. Because the jumper ant-sting register suggested the possibility that allergic reactions to ant venom may be responsible for significant morbidity in the community, we undertook a postal survey of residents living in rural and semirural areas of the state of Victoria to determine the frequency and severity of allergic reactions to ant stings.

METHODS

A postal questionnaire was sent to 600 residents of four federal electorates in Victoria. Each of the four electorates has approximately 70,000 adults on the electoral roll, from which 150 were randomly selected. Twenty-five questionnaires were completed by telephone interview.

The questionnaire had large color photographs of jumper and bull ants to aid identification. Respondents were asked whether they had ever been stung by jumper or bull ants, and about the nature of the subsequent reaction.

The sample size was calculated to detect an estimated prevalence of 1.4% with a 95% confidence interval between

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J Allergy Clin Immunol 1998;101:129-31.

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0091-6749/98 \$5.00 + 0 1/54/85688

TABLE I. Reported reactions to ant stings ($n = 402$)

	Total no. of reactions	No reaction	Local reaction	Generalized reaction	Prevalence of generalized reactions (%)	95% confidence intervals (%)
Jumper ant	66	2	57	7	1.7	0.7-3.6
Bull ant	19	0	17	2	0.5	0.06-1.8
Jumper and bull ant	13	1	11	1	0.2	0.01-1.4
Ant species unknown	14	0	12	2	0.5	0.06-1.8
Total	112	3	97	12	2.9*	1.6-5.2

*Total prevalence of generalized reactions, which includes respondents unable to identify the ant species.

TABLE II. Systemic reactions to jumper- and bull-ant stings

Ant species	Patient characteristics		Systemic reaction
	Age (yr)	Sex	
Jumper ant	18	M	Dyspnea, generalized urticaria, abdominal pain, diarrhea, collapse
Jumper ant	43	M	Generalized urticaria, facial angioedema, vomiting, diarrhea, collapse
Jumper ant	38	F	Generalized urticaria
Jumper ant	42	F	Dyspnea
Jumper ant	71	F	Wheeze, rhinitis
Jumper ant	18	M	Collapse
Jumper ant	23	M	Dyspnea
Jumper and bull ant	55	F	Dyspnea, collapse
Bull ant	44	F	Dizziness, rhinitis
Bull ant	39	F	Dyspnea, abdominal pain, collapse

In all cases there was a local reaction at the site of the sting.

0.2% and 2.5%, on the basis of the jumper ant sting registry and allowing for a 70% response rate. Exact 95% confidence limits for the final prevalence estimates were obtained from published tables of the binomial distribution ($n = 400$).

RESULTS

Four hundred seventeen completed questionnaires were returned. In 15 cases the questionnaires were returned unanswered because the addressee no longer lived in the electorate, giving an adjusted response rate of 71.3%. One hundred twelve respondents (26.9%) reported being stung by ants. Sixty-six were stung by jumper ants and nineteen by bull ants. Fourteen respondents were unsure which type of ant stung them; therefore their responses have been excluded from further analysis. The most common location in which stinging occurred was the backyard (34%) followed by uncleared bush (32%). The majority of stings were on the leg (61%) or the arm (31%).

A summary of the sting reactions including the prevalence of generalized reactions is presented in Table I, and the nature of the systemic reactions is summarized in Table II. Sixty-four percent of respondents had been stung only once, and six of the 13 who had experienced a generalized reaction could recall no previous ant sting. Only three of 10 generalized reactions were treated with epinephrine. Asthma, rhinitis, and eczema were reported by 11%, 34%, and 10% of the respondents, respectively. None of these atopic diseases was overrepresented in the group who had allergic reactions to ant stings.

DISCUSSION

We report a 2.4% prevalence of systemic reactions after jumper- or bull-ant stings in the rural or outer suburban population of southeastern Australia. The prevalence of anaphylactic reactions after bee stings in Australia is 2.7%.⁴ These data suggest that allergic reactions to ant stings present a similar potential threat to public health in southeastern Australia as do bee stings. Only three of 10 subjects who reported generalized reactions were treated with epinephrine. This may reflect the geographic isolation of many of the inhabitants in the study area.

The natural history of allergic reactions to *Myrmecia* venom remains to be defined. The length of time that hypersensitivity persists and the probability of recurrent anaphylactic reactions on resting are unknown. In one study the levels of IgE that bound to venom of several species of *Myrmecia* fell dramatically over a 12-month period in three subjects, which suggests the possibility that hypersensitivity may not be long lasting. However, repeated stings may resensitize persons at risk. This may be a relevant factor because 19% of respondents in this survey had been stung on three or more separate occasions.

The high prevalence and aggressive nature of jumper and bull ants ensure a significant rate of recurrent stings. If the likelihood of recurrent anaphylaxis proves to be high, then the development of a specific immunotherapy regimen would represent a major advance in the management of this allergy.

We thank Dr. Robert Taylor for providing information about the range of the jumper ant in Australia.

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