



INSTRUCTIVE CASE

A case of ant anaphylaxis

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Abstract: A four-year-old girl developed anaphylaxis following ant stings at her parent's property in country New South Wales. The offending insect was identified by an entomologist as the green head ant. Ant sting anaphylactic reactions in Australia, the importance of identifying the offending insect following sting anaphylaxis and the signs of insect sting anaphylaxis are further discussed.

Key words: anaphylaxis; ant; *Rhytidoponera*.

Case

A four-year-old girl was playing outside at the family's country property in far north, New South Wales (NSW) when she reported being stung by three ants on her left leg. The mother described them as black with a green tinge.

Twenty minutes after being stung, the girl developed generalised urticaria, facial angioedema, persistent abdominal pain, vomiting and became lethargic. She had no symptoms to suggest respiratory involvement.

Her parents drove her to the local hospital 30 min away. On arrival at the hospital, she had ongoing abdominal pain and lethargy. There was no record of blood pressure being taken. Oral prednisolone and promethazine were given, and she recovered and was discharged home. Apart from large local reactions to mosquito bites, the child had been previously well, with no

history of an atopic disorder. She had not been knowingly stung by bees, wasp or ants previously.

Ants from around the house that were thought to have been responsible for the reaction were collected and identified by the Department of Medical Entomology at Westmead Hospital, NSW, as *Rhytidoponera metallica*, also known as the green head ant (Fig. 1). Specific IgE level to honey bee venom was performed and was negative but strongly positive to yellow jacket wasp venom.

Management steps included provision of an adrenaline auto-injector, an insect venom-specific anaphylaxis plan from the Australasian Society of Clinical Allergy and Immunology (ASCIA) and a Medi-alert bracelet. Destruction of the ant nests around the home and wearing closed shoes outside was suggested. Venom-specific IgE testing and immunotherapy to green head ant venom are currently not available.

Key Points

- 1 In Australia, most ant sting anaphylactic reactions are caused by jumper ants and bulldog ants.
- 2 In insect sting anaphylaxis, collection of the offending insect and inspection by an entomologist is recommended in cases where the identity of the insect remains unclear.
- 3 In contrast to food allergy, persistent abdominal pain and vomiting are recognised as early warning signs of insect sting anaphylaxis and should prompt the immediate administration of intramuscular adrenaline.
- 4 Currently, no commercially available immunotherapy to ant venom exists, and as such, patients should be given an adrenaline auto injector an anaphylaxis plan and take steps to try and reduce the chance of re-sting.

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Discussion

In metropolitan areas, foods and drugs cause the majority of anaphylaxis presentations to emergency departments,¹ but in regional and rural areas, insect stings are more often encountered and may be a major cause.² The prevalence of insect sting anaphylaxis is low in small children but increases in prevalence with age.³

In Australia, the causative insects vary greatly between geographical regions. Honeybees are a major cause throughout most populated and agricultural areas. Paper wasps are a common cause in warmer regions of northern Victoria, NSW and Queensland (QLD) as well as some parts of Western Australia (WA).⁴ Yellow jacket wasps ('European wasps') are an occasional cause in cooler parts of Tasmania and Victoria.³

A variety of native ants may also cause anaphylaxis. Characteristic features of the major ant species reported to cause anaphylactic reactions in Australia are summarised in Figure 1. Ants of the genus *Myrmecia* (jumper ants and bulldog ants) are the most important and in some rural areas, cause more cases of anaphylaxis than honeybees.^{2,3} This is probably directly related

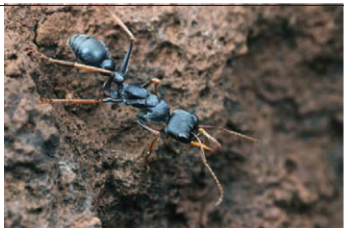
	Jumper ant (1): <i>Myrmecia (pilosula)</i> species group, comprising at least 5 distinct sibling species ("Jack jumper ant", JJA), but probably with identical venom allergens.	Jumper Ant (2): <i>Myrmecia nigrocincta</i> (sometimes referred to as the "lady jumper ant"). Venom appears to be distinctly different form that of the <i>Myrmecia (pilosula)</i> species group.	Bull dog ants (<i>Myrmecia spp.</i>)	Green head ant, <i>Rhytidoponera metallica</i>
			 	
Characteristics	10-15 mm Aggressive day-time foragers found mainly in or around native bushland. Often hunt alone and are attracted to movement. Black body with orange jaws and limbs. Moves with jerky/jumping motion.	Similar to the Jack Jumper in size and behaviour but with characteristic orange banding across the body. Found mainly in or around native bushland.	15-25 mm, variety of different species with colours ranging from black/brown through to red/orange. Found mainly in or around native bushland.	~ 7 mm in length. Scavengers/predators. Often first insects to forage after bushfires. Common in grass and gardens around houses.
			Many species forage and are encountered mainly at evening and night, but they may cause stings at any time of the day (especially if the nest is disturbed)	
Australian distribution	Tasmania, Vic, NSW (Snowy Mountains, Blue Mountains), ACT, Adelaide Hills (SA), Queensland, some parts WA	Limited to Northern NSW and south east QLD	Similar distribution to jumper ants	Throughout Australia, but particularly common in NSW and QLD
Venom-specific IgE testing available	+	<u>Not available</u>	<u>Not available</u>	<u>Not available</u>
Immunotherapy available	+	Not available	Not available	Not available
Anaphylactic death reported (in Australia)	+ (n=4)	<u>Not reported</u>	+ (n=1)	<u>Not reported</u>

Fig. 1 Characteristics of jack jumper, bulldog, green head and imported fire ants (photos taken by Mr Alex Wild and reprinted with permission from <http://www.myrmecons.net/ants>).

to population sting exposure – in Tasmania, 12% of the population is exposed to jack jumper ant (JJA) stings every year.³ *Myrmecia* ants are found mainly in cooler coastal and elevated regions of mainland Australia from South Australia (SA) around to southeast QLD, the southwest of WA and Tasmania. Another relatively common cause, particularly in northern NSW and southeast QLD is *Rhytidoponera metallica* (green head ant).⁴ Other genera are also occasionally reported as causes have included *Pachycondyla*, *Heteroponera*, *Odontomachus* and *Cerapachys* and *Solenopsis*.

An *in vitro* test to detect IgE levels to JJA venom is available to Australian clinicians (SouthPath Laboratories, Flinders Medical Centre, SA, Australia). The test has a moderate sensitivity (75%) but a high specificity (100%). Patients with a history of JJA anaphylaxis would benefit from immunotherapy since such individuals are often re-stung; the re-sting allergic reaction rate is high (i.e. 70%, with half of such reactions being life-threatening) and the allergic sensitivity to venom tends to last for many years.³ Subcutaneous immunotherapy to purified JJA venom has been developed in Australia and has been shown to be a highly



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ACTION PLAN FOR Anaphylaxis

(Insect allergy)

Name: _____

Date of birth: _____

Photo

Insect allergies: _____

Other allergies: _____

Family/carer name(s): _____

Work Ph: _____

Home Ph: _____

Mobile Ph: _____

Plan prepared by: _____

Dr _____

Signed _____

Date _____

How to give EpiPen® or EpiPen® Jr

1



Form fist around EpiPen® and PULL OFF GREY SAFETY CAP.

2



PLACE BLACK END against outer mid-thigh (with or without clothing).

3



PUSH DOWN HARD until a click is heard or felt and hold in place for 10 seconds.

4



REMOVE EpiPen® and DO NOT touch needle. Massage injection site for 10 seconds.

for use with EpiPen® or EpiPen® Jr adrenaline autoinjectors

MILD TO MODERATE ALLERGIC REACTION

- swelling of lips, face, eyes
- hives or welts

ACTION

- if sting can be seen, flick it out immediately (but do not remove ticks)**
- stay with person and call for help
- give medications (if prescribed)
- locate EpiPen® or EpiPen® Jr
- contact family/carer



Watch for any one of the following signs of Anaphylaxis

ANAPHYLAXIS (SEVERE ALLERGIC REACTION)

- abdominal pain, vomiting
- difficult/noisy breathing
- swelling of tongue
- swelling/tightness in throat
- difficulty talking and/or hoarse voice
- wheeze or persistent cough
- loss of consciousness and/or collapse
- pale and floppy (young children)

ACTION

- 1 Give EpiPen® or EpiPen® Jr**
- 2 Call ambulance*- telephone 000 (Aus) or 111 (NZ)**
- 3 Lay person flat and elevate legs. If breathing is difficult, allow to sit but do not stand**
- 4 Contact family/carer**
- 5 Further adrenaline doses may be given if no response after 5 minutes (if another adrenaline autoinjector is available)**

If in doubt, give EpiPen® or EpiPen® Jr

EpiPen® Jr is generally prescribed for children aged 1-5 years.
*Medical observation in hospital for at least 4 hours is recommended after anaphylaxis.

Additional information

Fig. 2 ASCIA action plan for patients with insect venom anaphylaxis (<http://www.allergy.org.au/content/view/10/3/>). Abdominal pain and vomiting are recognised as signs of insect venom anaphylaxis.

effective form of immunotherapy in a randomised control trial.⁵ Unfortunately, commercial development of a standardised JJA venom extract has been difficult because of issues of cost and lack of pharmaceutical company interest.⁶ In Tasmania, it is available through an immunotherapy program at the Royal Hobart Hospital, where a local venom extract is produced in-house.

The case reported here was apparently stung by a green-head ant. However, this could not be confirmed by venom-specific IgE testing as such testing is not widely available. Whether the child is at risk of having an allergenic reaction, due to cross-reactivity, to other ant venoms is not clear. Her IgE sensitisation to yellow jacket wasp venom may have been a result of an unwitnessed sting by a yellow jacket wasp or alternatively, there may be a degree of cross-reactivity between yellow jacket and

green ant head venom. Interestingly, the venom of the ant *Pachycondyla chinensis*, which belongs to the same subfamily (*Ponerinae*) as the green-head ant, has been shown to have a cross-reaction with yellow jacket venom.⁷

Accurate identification of the causative insect allows steps for avoidance, appropriate destruction of nests/hives around the home by a pest control company registered with the Australian pest controllers association and immunotherapy for those who have had anaphylactic reactions to specific insects (honey bee, paper wasp, yellow jacket, JJA). The dilemma in this case was the inability to confirm causation with specific IgE testing. It could be argued that a yellow jacket may have been responsible, but these are not commonly encountered in NSW and the circumstances of the case (multiple stings on grass around the house where the

ants were active) make *Rhytidoponera metallica* a far more likely cause. Asymptomatic sensitisation to wasp and bee venom can occur due to *in vitro* IgE cross-reactions, particularly in individuals with high total IgE levels. Venom immunotherapy is not warranted in anyone with a positive specific IgE venom blood test alone in the absence of a prior anaphylactic reaction.

Although our case had no concurrent atopic disorder, individuals with atopy are often mistakenly thought to be more prone to sting allergy. The risk of insect allergy is not increased in those with atopy but is strongly associated with repeated sting exposure, particularly if this occurs over a short period of time.

The presence of abdominal pain and vomiting in this case were significant symptoms that indicate at least moderate severity and a risk of severe reactions in the future. In the setting of insect venom, they have an association with hypotension and/or hypoxia.² Persistent abdominal pain and vomiting are recognised as early warning signs of insect sting anaphylaxis, and the presence of such symptoms should prompt the rapid administration of intramuscular adrenaline (Fig. 2).

Until standardised venoms for patients with ant sting anaphylaxis are made available, such patients should be prescribed an adrenaline auto-injector, have an appropriate anaphylaxis action plan and Medi-alert bracelet, and use simple avoidance measures such as wearing jeans and shoes outside, use of

ground blankets at picnics and eradication of nests around the home. Patients may also be directed to the ASCIA web site (<http://www.allergy.org.au>) to check on updates on treatment options and research programmes being undertaken particularly for those with ant anaphylaxis.

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