

The Latest Buzz Surrounding Allergy to Insect Stings



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Allergic reactions to insect stings constitute a significant medical problem, reported in up to 3% of adults and almost 1% of children.¹ However, many fatalities are thought to go unrecognized and usually occur in those > 45-years-old, but also in very young children and often with no prior history of a reaction.²

The insects and their venom



Figure 1. Honeybee.



Figure 2. Yellow jacket.

The stinging insects are members of the order Hymenoptera and are broadly divided into two families: the vespids (yellow jacket, hornet, wasp) and apids (honeybee and bumblebee). Although identification by the patient has been shown to be unreliable, it is important via testing to identify the responsible culprit in order for specific venom immunotherapy (VIT) to proceed.

The honeybee and bumblebee are quite docile and tend to sting only when provoked. The honeybee usually loses its stinging mechanism in the sting process, thereby inflicting self-evisceration and death.

David and Jessica's cases

A 13-year-old boy developed painful swelling spreading the entire length of his right forearm within 2 hours of being stung by a "wasp" on his wrist. He became slightly diaphoretic and nauseous. His swelling resolved after 4 days.

Jessica, an 18-year-old woman, developed marked diffuse pruritic hives within 10 minutes of a sting, lasting one hour.

Whom would you refer for further assessment?

The yellow jacket is the most common cause of allergic insect sting reactions. These insects nest in the ground and are easily disturbed while lawn mowing and gardening. They are present in increasing numbers in late summer and fall. The yellow and white-faced (bald-faced) hornets which are closely related to the yellow jacket, nest in shrubs and are also easily provoked by activities such as hedge clipping. The immunogenic constituents of the venom are mainly enzymes and extensive cross-reactivity is seen within the vespid and apid families, but not between the two groups.

Table 1

Risk of systemic reactions over time with repeat sting in specific patient groups

Previous reaction		Risk of systemic reaction	
Severity	Age	1 to 9 years	10 to 20 years
Large local	All	< 10%	< 10%
Urticaria (diffuse)	Child	10%	5%
	Adult	20%	10%
Anaphylaxis	Child	40%-50%	30%
	Adult	60%-70%	40%
VIT	All	2%	5%-10%

VIT: Venom immunotherapy

The spectrum of clinical reactions

The normal reaction is mild erythema, pain and swelling at the insect site. This is caused by vasoactive amines and can last from several hours to rarely one to two days. Analgesics and cold compresses are all that are needed for treatment.

Large local reactions

Large local reactions involve more severe contiguous swelling (may involve an entire limb) and can last anywhere from several days to a week. These delayed immunological reactions may be associated with mild nausea, fatigue and malaise, but are dangerous only with local compression of the airway. Secondary infection is uncommon. The risk for anaphylaxis in

a subsequent sting is very low in these patients, usually $\leq 5\%$.

Traditionally, people who have had large local reactions are usually not considered candidates for VIT and do not require venom skin tests.³ However, recent data suggests VIT can be used successfully for treatment of those with large local reactions who are frequently exposed.⁴ More unusual reactions to venom include toxic reactions from multiple stings and serum sickness.

Anaphylaxis

The overall incidence per sting varies from 0.4% to 3%, the frequency of which does not relate to atopic background. Reactions often follow a predictable pattern in each patient. Skin symptoms (flushing, urticaria, angioedema) occur in 80% and airway symptoms are present in 60% of patients. Circulatory symptoms are more common in adults (30%) than children (5%) and biphasic reactions can occur in up to 20% of patients.



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Natural history


If patients have a history of a systemic reaction, the future systemic risk with a subsequent sting ranges between 40% and 70%,⁵ with increased risk in adults, those with more severe and recent reactions, honeybee allergy, asthma and those using β -blockers. Although children with diffuse urticaria are at low risk for a systemic reaction, > 30% of children with moderate to severe reactions can react severely upon re-stinging, up to 18 years afterwards.⁶ All adults who have had more than local reactions are candidates for intradermal skin testing and immunotherapy, as their risk remains high (up to 40% after 20 years) for a severe reaction upon re-stinging.

Intradermal testing and VIT

All patients with a systemic reaction (except children with diffuse urticaria only) are candidates for testing and VIT. Both skin and radioallergen sorbent testing are done to minimize the false negative rate. Only through demonstration of IgE to specific venom can VIT be considered. Reduced mortality and improved quality of life for these patients can then be achieved. VIT has been shown to reduce the likelihood of a systemic reaction from about 60% to 70% with a future sting, to < 5%. This protection has also been shown to last for years following cessation of therapy, which usually lasts for three years. Patients may still elect to carry their self-administered epinephrine syringes during the high-risk season (unless skin tests become negative) and also should wear an identification bracelet. At present, studies are examining a

Take-home message

- Local and large local reactions to insect stings are common and, although they have an immunological basis, are managed supportively and require no further investigations or treatment
- Diffuse skin reactions in children also can be managed conservatively and are not at significant increased risk for further systemic reactions
- Diffuse skin reactions in adults and all those with systemic reactions require referral to an allergist for further work-up, including skin testing to isolate specific IgE antibodies against the precise culprit insect, as well as for consideration of VIT, an effective and lifesaving form of treatment

fast disintegrated tablet of sublingual epinephrine and with further development may replace intramuscular injections for anaphylaxis.⁷ 

References

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