Instant Reference for Health Professionals

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Practice Parameters for Diagnosis and Management of Stinging Insect Hypersensitivity

This practice parameter is based upon current clinical practice and extensive review of the clinical literature and has been developed by the Joint Task Force on Practice Parameters of the American College of Allergy, Asthma & Immunology (ACAAI), the American Academy of Allergy, Asthma and Immunology (AAAAI), and the Joint Council of Allergy, Asthma & Immunology (JCAAI).

Identifying Stinging Insects

Identification of the insect responsible for the sting may be helpful for diagnosis, treatment, and management, including avoidance.

- ***Yellow jackets*** are ground dwelling insects encountered in yard work, farming, or gardening, in wall tunnels or crevices, and in hollow logs. Yellow jackets are very aggressive and sting with minimum provocation, especially in the presence of food.
- ***Hornets*** are extremely aggressive and related to yellow jackets. They build paper-maché nests that may be several feet in diameter and are usually found in trees or shrubs.
- ***Wasps*** build honeycomb nests that are several inches or more in diameter. Wasps may be seen on the outside of the nest. The nests may be found in shrubs, under the eaves of houses or barns, and occasionally in pipes on playgrounds or under patio furniture.
- ***Honeybees*** are found in domestic or wild hives. Wild hives may be found in tree hollows, old logs, or in buildings. Bees are usually not aggressive when away from their hives. Honeybees usually leave a barbed stinger with attached venom sac when they sting.
- ***Fire Ants,*** which may be red or black, are found in mounds made of fresh soil that may be at least several inches high and may be one to two feet in diameter. There may be multiple mounds a few feet apart. Their mounds are common along southeastern roadways. They are very aggressive if their mounds are disturbed and are often responsible for multiple stings. A sterile pustule usually develops at the site of a sting in less than 24 hours.

Avoidance of Stinging Insects:

- Have known or suspected nests in the immediate vicinity of the patient's home exterminated by trained professionals; periodic evaluation by experts regarding the existence of nests should be considered.
- Avoid wearing brightly colored clothing or flowery prints, as well as strongly scented lotions that may attract insects.
- Do not walk outside without shoes. Walking in socks or sandals can also be dangerous.
- Be cautious near bushes, eaves, attics, and avoid garbage containers and picnic areas. Avoid exposure to food outdoors.
- Keep insecticides readily available. They can be used to kill stinging insects from a distance if necessary. Stinging insects are not affected by insect repellents.
- Wear long pants, long-sleeved shirts, socks, shoes, head covering, and work gloves when working outdoors.

Types of Insect Sting Reactions

Most insect stings result in *local reactions.* These include:

- Redness
- Swelling
- Itching and pain

Systemic reactions apply to a spectrum of manifestations ranging from mild to life threatening. These include:

- Cutaneous responses — e.g., urticaria and angioedema
- bronchospasm
- obstructive edema of the upper airway
- hypotension and shock

The key feature that distinguishes a systemic reaction from a large local one is that a systemic reaction occurs in a location that is not contiguous with the site of the sting.

Treatment of Reactions

Local reactions (the following may be considered):

- Cold compresses may reduce local pain and swelling.
- Local anesthetic cream.
- Oral antihistamines.
- Oral analgesics.
- Some physicians use topical or oral corticosteroids for particularly large reactions and/or severe symptoms, though this is controversial.
- Antibiotics are not required unless there is evidence of secondary infection.

Systemic Reactions:

- Epinephrine- should be given promptly.
- Antihistamines may be required.
- Corticosteroids may reduce the likelihood and severity of a late-phase reaction.
- Inhaled $beta_2$ agonist may be necessary for pulmonary symptoms.
- IV fluids and reclined position if hypotension is present.
- See Practice Parameters for Anaphylaxis for more information.

Patient Education

Patient education is essential if life-threatening reactions are to be avoided and/or treated effectively when they do occur.

Key educational messages:

- How to identify stinging insects
- Where stinging insects are likely to be found
- How to avoid being stung by an insect
- Treatment of local reactions
- When and how to use self-injectable epinephrine
- Self-identification of patients at high risk — e.g., consider obtaining a MedicAlert™ bracelet or necklace

Skin testing with Venoms and Fire Ant Whole Body Extracts

Indications for Venom (other than fire ant) Skin Testing and Immunotherapy

- Venom testing should be deferred for 3 weeks or more after the sting.
- Skin testing should be done if immunotherapy is being considered.
- Children 16 years old and under with a history of generalized urticaria may not require skin testing or immunotherapy.
- All other patients with a history of a systemic reaction should have venom skin testing.

Method for Venom Skin Testing

- It is desirable to test with all available venoms, even if the stinging insect has been identified, due to errors in identification and immunologic cross-reactivity.
- Start with 1.0 mcg/ml percutaneous test — e.g., prick/puncture.
- If percutaneous testing is negative, continue with 0.01 mcg/ml intracutaneous and increase by 10-fold concentrations to a maximum of 1.0 mcg/ml or until positive reaction occurs.
- A positive test at any of these dilutions indicates the presence of specific IgE antibodies to venom.
- Positive and negative controls should be used at least for the first two tests.

Indications for Fire Ant Whole Body Extract Skin Testing and Immunotherapy

- Fire ant testing should be deferred for 3 weeks or more after the sting.
- Skin testing should be done only if immunotherapy is being considered.
- Anyone with a history of a systemic reaction to a fire ant should have skin testing with whole body extract.

Method for Fire Ant Skin Testing

- Since there is no commercially available fire ant venom, whole body extract is used.
- Start with 1:1000 (w/v) percutaneous test — e.g., prick/puncture.
- If percutaneous testing is negative, continue with 1:1,000,000 (w/v) intracutaneous and increase by 5 to 10-fold concentrations to a maximum of 1:1000 (w/v) or until a positive reaction occurs.
- A positive test at any of these dilutions indicates the presence of specific IgE antibodies to fire ant.
- Positive and negative controls should be used at least for the first two tests.

Immunotherapy for Stinging Insects

Venom immunotherapy (VIT) and immunotherapy with whole body fire ant extract have been shown to reduce the risk of a systemic reaction on subsequent stings from 60% to less than 3%. For that reason, patients for whom it is indicated should be urged to receive it. The goals are to (a) prevent life-threatening reactions, and (b) alleviate anxiety related to insect stings. In general, immunotherapy should be given with each stinging insect extract to which the patient has a positive skin test. Occasionally, when a single insect is implicated and significant immunologic cross-reactivity exists, it is reasonable to give shots with a single insect.

Immunotherapy Procedures:

- Injections usually are given initially at weekly intervals beginning with 0.1 to 0.5 mcg and increased to a maintenance dosage of up to 100 mcg per insect.
- More accelerated schedules for VIT have been validated and may be used successfully.
- The interval between maintenance dose injections is usually increased to 4-week intervals during the first year and eventually to every 6 to 8 weeks during subsequent years.
- The frequency and dosage schedule for which injections are given for buildup in fire ant immunotherapy is less well defined.
- Most experts recommend a maintenance dose of 0.5 ml of 1:100, however some recommend increasing to 0.5 ml of 1:10, if tolerated, for fire ants.
- Safety considerations related to administration of insect injections are the same as for other forms of allergen immunotherapy.
- The major risk of VIT, as with other types of allergen immunotherapy, is anaphylaxis.
- Patients who are taking beta-adrenergic blocking agents and possibly patients taking ACE inhibitors are at greater risk if they experience an allergic reaction.

Guidelines for Referral to an Allergy/Immunology Specialist

Referral to an allergist-immunologist who has had training and experience in the diagnosis, treatment, and patient education regarding stinging insect hypersensitivity should be considered for patients who:

- have experienced a systemic reaction to an insect sting
- have experienced anaphylaxis and an insect sting was a possible cause
- need education regarding stinging insect avoidance or emergency treatment
- may need venom immunotherapy
- have a co-existing condition that may complicate treatment of anaphylaxis (e.g. beta-blockers, hypertension, cardiac arrhythmias)
- ask for a consultation

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