

Emergency medical services

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UNWELCOME VISITORS: Is EMS Ready for FIRE ANTS AND KILLER BEE

What you should know about treating victims of-and staying safe from-these dangerous swarming insects attacking insects



Africanized honeybees (AHBs) are originally from Africa.



Fire ants (*Solenopsis invicta*), also referred to as red imported fire ants, originated in South America.

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In January a 47-year-old man was viciously attacked by bees while working in the backyard of his home in Cape Coral, FL. His daughter, responding to his screams, came running and found him covered by a swarm. Her father is allergic to bee stings. She went back into the house to call 9-1-1. Firefighters arrived and sprayed water on the man in an attempt to remove the bees. It didn't work. Instead, they had to strip off the man's clothes and, with gloved hands, get the bees off him. "I've never seen bees so aggressive in my life," the daughter said. Firefighters estimated there were 40,000-50,000 bees in the 2' x 3' hive that had been disturbed. The man was emergently transported to a local hospital and placed on a mechanical ventilator. He spent 48 hours in the ICU and ultimately did well.

International travel and global exploration have effectively made the world much smaller. With these travels, animal and plant species are sometimes introduced, either intentionally or accidentally, to new geographic areas. Sometimes this is beneficial. More often, it is harmful.

The United States has had several unwanted species introduced. Of these, fire ants and Africanized honeybees (AHBs), also known as killer bees, have become a particular problem. Both have progressively spread across the United States and, especially in the case of AHBs, pose significant health risks.

Fire Ants

Fire ants (*Solenopsis invicta*), also referred to as red imported fire ants, originated in South America and came to the United States through the port of Mobile, AL, in the 1930s. Fire ants are medium-sized ants that build mounds of soft soil. The mounds are relatively small compared to those of other ant species. Fire ants are attracted to electrical currents and commonly build their mounds near electrical lines and equipment. When disturbed, they emerge aggressively from their mound and sting repeatedly. Their sting causes immediate pain and usually leaves a white pustule on the skin.

Fire ants have slowly spread from Alabama throughout the southeastern United States, and are now spreading westward through the desert southwest into California. Attempts to control them have been largely unsuccessful.

EMS Considerations

Fire ants are extremely aggressive and inflict numerous stings. Children and babies are most susceptible to fire ants. For adults, the stings can be painful. However, for those allergic to ant venom, the stings can induce an allergic reaction or even anaphylaxis.

Their venom is only lethal in large quantities. It is an alkaloid and causes pain. It is also a hemolytic, causing swelling. Fire ants can sting repeatedly, administering large quantities (relatively speaking) of venom.

If you are called to treat a person attacked by fire ants, ensure you are wearing gloves and other personal protective equipment. If the victim has not been removed from the fire ant mound, do so as soon as possible. With a gloved hand, knock off any remaining ants, as they will continue to sting. Be aware that some ants will get into body crevices. Once the ants are removed, assess the patient. If there are problems breathing or other signs of an allergic reaction, begin treatment. Treatment should include the administration of supplemental oxygen. If allergic symptoms are present (e.g., hives, wheezing, rash, stridor), consider the administration of epinephrine 1:1,000 subcutaneously or intramuscularly. Also, consider administering an antihistamine such as diphenhydramine (Benadryl). If the patient develops anaphylactic shock, consider intravenous epinephrine, inhaled beta agonists and possible corticosteroids. For patients without allergic symptoms, instruct them to clean the ant stings with soap and water and apply a drying solution such as calamine lotion. The lesions will usually clear in 48 hours.

Africanized Honeybees

As the name indicates, Africanized honeybees (AHBs) are originally from Africa. In 1956, some colonies were imported to Brazil with the idea of cross-breeding them with local populations of honeybees of European origin in order to increase honey production. In 1957, 26 African queen bees, along with swarms of European worker bees, escaped from an experimental facility south of Sao Paulo. These African escapees subsequently interbred with European honeybees, creating hybrid AHB populations. These have gradually spread northward through South America, Central America and eastern Mexico, progressing approximately 100-200 miles a year. In 1990, AHBs reached southern Texas. By 1993 they had appeared in Arizona, and by 1995 California. They have also appeared on the Florida peninsula and are spreading north.

AHBs are much more aggressive than their European counterparts and attack in greater numbers. Since their introduction into Brazil, they have killed some 1,000 people. In many instances, victims received 10 times as many stings as victims of the European strain. In addition, AHBs tend to respond to disturbances 10 times faster than European honeybees. In some instances, they have been known to chase a person a quarter of a mile.

One sting from an Africanized honeybee is no more dangerous (or painful) than a sting from any other honeybee; in fact, the venom is almost identical. However, AHBs tend to sting in greater numbers and with less provocation. Regardless, persons who are allergic to bee venom may develop a life-threatening reaction to just a few stings.

Physically, AHBs are virtually identical to European honeybees to the untrained eye. Only their behavior and aggressiveness demonstrate their difference. AHBs nest in many areas, including holes in trees, poles, shrubs, birdhouses, abandoned vehicles, sheds and similar structures. Several things have been found to trigger AHB attacks. These include engine vibrations, intrusion into a defended space, a direct threat to the hive, loud noise or even the act of swatting a bee. If you swat a bee and crush it, its body releases a chemical messenger (a pheromone with a banana-like odor) that will incite other bees to attack. Attempts to control the spread of AHBs have been futile.

EMS Considerations

AHB attacks are a high-risk situation. The bees do not discriminate in whom they attack. Furthermore, they will follow a person for some distance and continue to sting. If an EMS or fire crew is called to care for a victim of bee stings, it is best to assume the offending insects are AHBs, especially in areas where colonies have been identified. However, because the spread of AHB colonies has occurred so quickly, they can be virtually anywhere.

The response to a possible AHB attack should include at least one ambulance and one piece of fire equipment. Upon arriving stage approximately 150 feet from the hive and stay out of the bees' path. All responding personnel should don full protective equipment (no SCBA is necessary). If ambulance personnel do not have protective equipment, they should not approach the patient. Upon arrival, determine how many patients are present. This is best done through binoculars. If several patients are present, consider summoning additional resources and designating a staging area. If anyone is being attacked, the first priority should be rescue. If no one is in danger, then preparations should be made to eradicate the bees and hive.

Patient Rescue

If a patient is in immediate danger, they should be removed from the hazardous environment. The approach to the hazardous area will depend upon the resources available. If fire department personnel are on scene, rescue can be performed immediately. Ideally, three crew members wearing full protective equipment should prepare to enter the scene. Ankles and waists should be tightly taped in order to prevent bees from crawling into clothing. In addition, bee veils that extend over the helmet and upper chest should be donned.

The recommended approach has been to use a quick-attack 1½-inch hose line with the nozzle set at a full fog pattern. The crew should approach the patient at a quick pace, moving the nozzle in a circular fashion. Once at the patient's side, pick up the patient quickly while at the same time sweeping the surrounding air with fog. The crew should then retreat to a minimum safe distance (generally 150 feet) before beginning patient care. A member of the crew should monitor the bee activity and warn of approaching bees. If bees are approaching, the patient and crew should be moved farther away.

Bees do not have lungs. Instead, they use a system of tubes that carries oxygen to and carbon dioxide away from cells. This system of breathing tubes, or tracheae, is connected to the outside by a series of holes in the cuticle called spiracles. To asphyxiate a bee, you must occlude these holes. Water or a similar solution must penetrate past the hairs on the bee's body in order to asphyxiate it. However, the surface tension of water often prevents it from penetrating past the bee's hairs. Because of this, a wetting agent, usually a surfactant (a lipoprotein that decreases surface tension),

is required. It has been suggested that aqueous film-forming foam (AFFF) systems, commonly used for firefighting, be used. This approach is effective but can obscure the scene. Some studies have shown that a solution of dishwashing soap and water is effective in knocking down AHBs.

If rescue is required and fire department personnel are not available, a protective system such as the BeeAlert bee-control system (see www.beealert.com) might be considered. This system uses a proprietary surfactant that is highly effective against bees and wasps. When activated it provides a protective fog pattern that allows rescuers to enter the scene and remove victims to a safe distance. Unlike AFFF applications, the product does not obscure the patient and environment with foam.

If you are called to treat a person attacked by AHBs, ensure you are wearing gloves and other necessary PPE. With a gloved hand, knock off any remaining bees. Be aware that some bees will crawl under the patient's clothing and continue to sting. It is advisable to remove the patient's clothing to assure that all bees are removed.

Once the bees are removed, assess the patient. If there are problems breathing or other signs of an allergic reaction, begin treatment. Treatment should include the administration of supplemental oxygen. If allergic symptoms are present (e.g., hives, wheezing, rash, stridor), consider the administration of epinephrine 1:1,000 subcutaneously or intramuscularly. Also, consider administering an antihistamine such as diphenhydramine (Benadryl). If the patient is in anaphylactic shock, obtain IV access and administer epinephrine. Because of third-spacing of fluid and vasodilation, consider a fluid bolus with a crystalloid solution. If the patient is wheezing or exhibiting stridor, administer an inhaled beta agonist. Consider the administration of an antihistamine such as diphenhydramine (Benadryl) or cimetidine (Tagamet). Corticosteroids may be administered based upon local protocols. Be prepared to administer CPR and provide mechanical ventilation.

Summary

Fire ants and AHBs are aggressive social insects that readily attack when they perceive a threat. Rarely, each can cause fatal allergic reactions. However, AHBs can overwhelm and kill even healthy, non-allergic people. Such encounters are relatively rare, yet increasing in frequency. As a rule, fire ants can't overwhelm a healthy, mobile person, and even hundreds of stings are rarely fatal. AHBs, however, pose a greater threat to EMS and fire personnel when encountered.

Every EMS agency in areas where AHBs are located (or predicted to migrate) should develop protocols for AHB attacks. Such a response should assure adequate personnel and, above all, rescuer safety. The protocol should be periodically practiced and reviewed.

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Bryan Bledsoe is a featured speaker at EMS EXPO, October 11-13, in Orlando, FL. For more information, visit www.emsexpo2007.com.