

TOXTALKS

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A BULLETIN FOR HEALTHCARE PROFESSIONALS WHO MANAGE POISONED PATIENTS

Blue Ridge Poison Center

University of Virginia Health

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Black Widow Spider Envenomation



Black widow spider on patio furniture, Charlottesville, Va. Photo credit: Corrine Haywood

Black widow spiders are native to North America, with several *Lactrodectus* species found in different regions of the country. In Virginia, *Latrodectus mactans* (southern black widow) is the most common. Female black widows have fangs long enough to penetrate human skin, while the males do not. Females are usually large (8-10 mm), black in color, and usually have a distinctive red hour glass pattern on ventral surface of the abdomen. This marking can

vary in color (red to orange) and in shape (hourglass, stripe, or spot).

Where are black widows encountered?

Black widows tend to be found in secluded areas, such as woodpiles, sheds, outhouses, garages, basements, barns, and shoes. They live in large, tangled, irregularly shaped webs close to the ground to trap small insect prey. Bites to humans are usually provoked by touching the web or the spider and are defensive in nature. Bites tend to occur during times when people are most likely to come in contact with spiders: during the warmer summer months or in the fall when the weather turns cool and spiders migrate indoors.

NEWS AND NOTES:

New Clinical Staff

Welcome to Abigail Kerns, MD, and David Schaffer, MD, who begin their two-year Medical Toxicology Fellowship this month. Dr. Kerns comes to us from an emergency medicine residency at Allegheny General Hospital in Pittsburgh. Dr. Schaffer completed his emergency medicine residency at Brigham and Women's / Massachusetts General Hospital in Boston. They are fantastic additions to our program.



Dr. Abigail Kerns



Dr. David Schaffer

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What is black widow venom?

The primary toxin in black widow venom is called alpha-latrotoxin. It binds to pre-synaptic neurons and increases influx of calcium into the cell. This influx of calcium causes massive release of vesicles containing neurotransmitters, such as acetylcholine and catecholamines, leading to symptoms of envenomation.

What are the symptoms of envenomation?

The bite of a black widow may feel like a pinprick or may initially go unnoticed. Pain typically develops 10-60 minutes around the area of the bite and erythema may be noted at the site. Localized diaphoresis may be seen at the site of the bite and a target lesion may develop. Over time, the pain progresses centrally from the bite site and causes severe muscle pain and fasciculations. Severe chest pain may develop and mimic other forms of acute chest pain. Abdominal rigidity may be seen and mimic a surgical abdomen. Nausea, vomiting, diaphoresis, hypertension, and tachycardia are also common. This constellation of systemic symptoms is known as latrodectism. The symptoms are a result of the massive neurotransmitter release, leading to muscle contractions from acetylcholine release and adrenergic symptoms from release of catecholamines. Intense pain often lasts for 2 days, followed by gradual decline and a washout period demonstrated by fatigue and weakness. This is thought to be due to the depletion of neurotransmitters that occurs during the acute phase of envenomation.

What is the treatment?

Treatment is aimed at relieving pain from muscle spasms and controlling hypertension. Benzodiazepines and opioids are the mainstay of treatment. Tetanus should be updated as needed. In the past it was believed that calcium gluconate, methocarbamol, and dantrolene were beneficial, however subsequent studies have failed to show efficacy of these treatments and they are no longer recommended.

Is there an antivenom?

An equine-derived, whole IgG Latrodectus antivenom is available for use in the US. Similar to other horse serum derived whole IgG antivenoms, the risk

of anaphylaxis and serum sickness is high. Given that mortality from black widow bites is low and the risk of reaction to the antivenom is high, the use of antivenom is reserved for high risk patients (extremes of age and pregnant women presenting with pre-term labor). A F(ab)2 fragment is currently in development and has shown promise in clinical trials, but is not yet approved for use in the US by the FDA. As a F(ab)2 fragment, it is expected to produce a lower rate of anaphylactic reactions and serum sickness.

Black widow spider envenomation is not often seen by medical professionals. While mortality is rare, the pain experienced by patients can be agonizing. As we enter summer, black widow envenomation should be on the considered in cases of atypical chest pain, abdominal pain, or an inconsolable child. In the event of a black widow bite, please contact the University of Virginia Health's Blue Ridge Poison Center at 1-800-222-1222, or use our dedicated healthcare provider hotline: 1-800-451-1428. Our center is collecting data associated with black widow envenomation and can help with management questions.

References available upon request.

The Blue Ridge Poison Center receives funding from University of Virginia Health, the Virginia Department of Health, and the U.S. Health Resources Services Administration (HRSA). We are accredited by the American Association of Poison Control Centers. We've been proudly serving the Commonwealth since 1978.

