



Blue Ridge Poison Center's

# Tox Talks

Vol. 6, No. 4 April 2008 A Bulletin for Health Care Professionals Who Manage Poisoned Patients <http://hsc.virginia.edu/brpc/>

## Black Widow Spider Envenomation

### DOES YOUR FACILITY HAVE TELEMEDICINE?

The Blue Ridge Poison Control Center offers CME-accredited toxicology lectures through telemedicine. To request a topic, schedule a lecture for your staff, or more information contact Heather Collier: 434-924-5185 or [HLC8E@virginia.edu](mailto:HLC8E@virginia.edu).

**THE UVA CENTER OF CLINICAL TOXICOLOGY** associated with the Blue Ridge Poison Center manages over 500 patients each year on site in the University of Virginia Health System - from outpatient clinic visits to critically ill inpatients managed in our pediatric and adult intensive care units. In addition, over 2,000 requests are made each year for consultation with our physicians from other healthcare facilities by phone or telemedicine. Our Boarded Medical Toxicologists are internationally known for the expertise in the care of poisoned patients. Call 1-800-222-1222 24 hours a day, every day. [Cell users: 1-800-451-1428]

<http://www.healthsystem.virginia.edu/internet/medtox/cct/ccthome.cfm>

### IN CHARLOTTESVILLE

Reminder: At University of Virginia Hospital, the first Wednesday of every month features toxicology Grand Rounds. For more information, contact Heather Collier: 434-924-5185 or [HLC8E@virginia.edu](mailto:HLC8E@virginia.edu)

- A 57 year old female presents to the emergency department with hypertension, diaphoresis and complaints of chest and left arm pain after stacking wood in her back yard.
- A 14 year old boy present to the emergency department with complaints of abdomen and right leg pain after cleaning up the basement. On physical exam he has a rigid abdomen.

How are these patient presentations related? They are common presentations of black widow spider (*Latrodectus mactans*) envenomations.

Black widow spiders are endemic throughout North America. Of the *Latrodectus* species found in North America *Latrodectus mactans* is the most common. Females of this species are the most dangerous as they are larger and have fangs that are capable of penetrating human skin. Males are much smaller and lack the ability to puncture human skin. Female spiders are approximately 8-10mm in body length, have a shiny-black appearance and typically have a red hourglass marking on the ventral abdomen. This characteristic hourglass pattern is variable, however, and can range from orange to red and may appear as only a small spot in this area.

Black widow spiders are generally a non-aggressive species, constructing shabby unkempt-appearing webs in secluded areas including at the bases of down-spouts, sheds, woodpiles and garages. Females rarely venture from the web and are prone to biting only when provoked through contact with the spider or web. Envenomations occur in warmer months when humans and spiders are likely to come in contact with each other.

The principal toxin in black widow venom is alpha-latrotoxin. This toxin acts on the pre-synaptic nerve terminal by opening ion channels (primarily calcium channels) resulting in release of acetylcholine at presynaptic terminals with subsequent downstream activation of adrenergic and motor neurons. The

manifestations of black widow envenomation are a result of this downstream activation of neurons. The initial bite may be mildly painful or may go unnoticed. Generally, within 30-60 minutes, painful muscle cramping along with fasciculations occur in the bitten extremity. Local symptoms may include erythema or blanching around the bite site with small central puncture wounds. Localized diaphoresis may also be present at the site of the bite. Muscle fasciculations and cramping progress centrally. Upper extremity bites often progress to chest pain which may mimic other causes of acute chest pain, while lower extremity bites may progress to severe abdominal pain and rigidity which may resemble an acute abdomen. Severe pain is the primary manifestation of envenomation. Systemic symptoms include hypertension, tachycardia, nausea, vomiting, and diaphoresis. Symptoms may last up to 2 days and may be followed by a “washout” phase where patients may have extreme fatigue and weakness. This phase is postulated to be a result of neurotransmitter depletion during the acute phase of envenomation.

Treatment modalities primarily involve treating pain and hypertension. The two most effective classes of agents include benzodiazepines and opioids. Most patients can be adequately treated through the liberal use of diazepam and fentanyl. Contrary to prior beliefs, calcium gluconate has shown not to be an effective treatment

In the United States an equine derived antivenom is available, however, similar to other immunoglobulin antivenoms, there is a high risk of allergic/anaphylactic reactions. As the risk of mortality following black widow envenomation is low, and the risk of anaphylactic reactions following antivenom administration is high, antivenom administration should be reserved for susceptible populations, this includes the elderly, children, and pregnant women with the possibility of pre-term labor. A Fab<sup>2</sup> antivenom is available outside the U.S. and may soon be available in the U.S. for therapeutic use. It is expected to have a smaller incidence of immune reactions such as serum sickness and anaphylaxis.

Black widow spider envenomation is not often seen by medical professionals. While mortality following envenomation is rare, the pain endured by victims is often agonizing. Black widow envenomation should be on the differential for atypical chest pain and abdominal pain and considered as a diagnosis in inconsolable children, especially as we are headed into the spring and summer months. For more information, a recent review article “Medical Aspects of Spider Bites” by Vetter and Isbister is available in *Annual Review of Entomology* published January 2008.

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