

Brown Recluse Spider Envenomations in Maryland: Real Threat or Overstated?

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The brown recluse spider (*Loxosceles reclusa*) has received a lot of attention in recent years as the cause of necrotic skin lesions. With the arrival of spring and warmer temperatures comes an increase in spider and insect bites along with the worry of getting bit by the notorious brown recluse spider. In most cases of spider envenomation, the spider is not available for identification and diagnosis is based on clinical presentation. It is important to clarify the true nature of the threat of brown recluse bites in Maryland.

The brown recluse spider, one of 6 *Loxosceles* species in the United States, is a small brown spider that has a flat body about 1/4 to 3/4 inch in length and 3/16 inch in width with a distinctive marking on its cephalothorax that resembles a violin. Brown recluse spiders from southern habitats tend to be larger than their counterparts from farther north. Not all brown recluse spiders have an overt marking, especially young and recently molted spiders. Unlike most spiders with four pairs of eyes, the brown recluse has only 6 eyes located in front of the violin-like mark. The brown recluse spider is essentially a nocturnal forager of other insects, and as the name implies, normally remains reclusive during the day in dark, undisturbed or cluttered areas.



Brown recluse spiders are not indigenous to Maryland.

When a bite is suspected, other causes of necrotic lesions should be investigated.

Brown Recluse Spider Envenomations

These spiders are endemic only to the south central portion of the United States (see map below, shaded area). The states predominantly inhabited by the brown recluse extend west, including most of Texas, and east to the western edges of the Carolinas as well as the northwest corner of Georgia, and from the gulf coast north to the southern areas of Iowa, Indiana, Illinois,

and Ohio including Arkansas, Kansas, Oklahoma, Louisiana, Missouri,

Tennessee, Mississippi, Kentucky, and Alabama. Other *Loxosceles* species are present in the lightly populated areas of the southwest. Although found as a common house spider in approximately 70% of the homes in central south states, the brown recluse has been implicated in only 10% of the spider bites in those areas. Sightings outside of the central southwest are very rare and usually are a result of transport of the spider out of its usual habitat. Populations tend to be isolated and limited to a single structure. According to the Maryland Cooperative Extension Service, brown recluse spiders are not indigenous to Maryland.

Bites from the brown recluse vary in severity from little or no reaction to severe dermal necrotic lesions occasionally accompanied with systemic symptoms. The amount of venom injected and individual sensitivity determines the magnitude of reaction. Children and the elderly are at greatest risk for severe complications. Many bites go unnoticed until intense pain and formation of a small white or hemorrhagic vesicle sur-



rounded by swelling occurs about 8 hours later. Onset of stinging or intense pain can start soon after the bite occurs. A small number of individuals experience systemic symptoms including restlessness, generalized itching, fever, chills, nausea, vomiting, or shock. Over the course of 24 to 72 hours, the area enlarges and reddens around a sinking lesion that takes on a blue-gray or blue-white color, sometimes referred to as "the red, white and blue sign". Most lesions usually range from 1 ½ to 2 ¾ inches or smaller in diameter but can develop into deep necrotic wounds with diameters around 10 inches. Most lesions heal slowly over the course of several weeks but may take several months in cases where significant tissue loss occurs. Lesions have ragged irregular edges that follow the gravity pull of the venom. The enzyme sphingomyelinase D, considered the main culprit, is one of eight components that contribute to the cytotoxic and hemolytic properties of the venom. In spite of the potential for severe complications of systemic hemolysis, renal failure, coagulopathy, and death, different sources indicate 90% to 95% of bites heal without complications.

Treatment depends on the stage and severity at time of presentation. Application of ice or cool packs to the site is thought to reduce swelling and limit the activity of sphingomyelinase D. General wound care with immobilization, elevation, and if necessary, local debridement, usually is all that is needed. Excision of the tissue at the target site, once thought to prevent spread of tissue damage, has fallen out of favor and is now thought to prolong the healing process. Early treatment with dapsone, an antibiotic with leukocyte inhibiting properties, is also thought to stop progression of tissue in-

Brown Recluse Spider Envenomations

volvement. Adverse effects including hemolytic anemia and methemoglobinemia in G-6-PD deficient patients coupled with the lack of studies confirming the drug's effectiveness have limited dapson's role. Steroids, nitroglycerin patches, and colchicine have been used to treat bites but there is no clear evidence supporting the effectiveness of these agents. Hyperbaric oxygen has been utilized to reduce wound size based on positive results from animal studies, but to date no human clinical trials have been attempted. Patients exhibiting systemic symptoms should be admitted and evaluated for coagulopathies, hemolysis, and renal involvement.

Without positive identification of a brown recluse spider, other causes of necrotic lesions should be ruled out during the diagnostic process. Necrotic lesions can be caused by bacterial (staphylococcus [MRSA], streptococcus, gonococcus, and cutaneous anthrax), viral or fungal infections. A good rule of thumb is to culture the wound. Bites from a variety of arthropods can result in a similar appearance (e.g., bulls-eye rash of Lyme disease). Lesions associated with lymphoproliferative and blood disorders, as

well as underlying disease states such as diabetes and pyoderma gangrenosum should be considered in patients with these conditions. Toxicologic causes include the dermal manifestations of chemical burns, reactions to poisonous resin plants, reactions to medications, Stevens-Johnson syndrome and idiosyncratic causes of erythema multiforme. Methods for confirming the presence of brown recluse spider venom in the bite are not commercially available. Misdiagnosis of necrotic lesions can lead to the delay of appropriate treatment.

Confirmation of brown recluse spider bites as the causative agent of necrotic lesions is a rare occurrence in areas routinely inhabited by this spider. Envenomation requires a spider normally reclusive and nocturnal to feel threatened. There are no known recent reports of brown recluse spiders or related species in the state of Maryland. In conclusion, envenomations by a brown recluse spider in areas not routinely inhabited by the spider, although possible, are highly unlikely. Special care should be taken to rule out alternative causes of necrotic lesions.

References are available upon request.

CHILD-RESISTANT PACKAGING

The Poison Prevention Packaging Act of 1970 requires that certain toxic substances (medicines and household products) be packaged in a way that would be difficult for children less than 5 years old to open. Currently, to meet the Consumer Product Safety Commission's (CPSC) regulations, closures must prevent at least 85% of children tested from opening the cap within 5 minutes, while 90% of seniors must be able to open them. Studies performed after this law went into effect clearly show declines in poisonings and fatalities. The CPSC estimates that there has been a reduction in the rate of childhood fatalities from prescription medicines of up to 45% from levels projected in the absence of child-resistant packaging. Combining prescription drugs with aspirin, it's estimated that the lives of over 900 children have been saved since 1970! Additional lives have surely been saved by special packaging on other products. Health care professionals should encourage the use and proper securing of child-resistant closures.



TOXNOTES

My patient overdosed on clonazepam two hours ago. She is arouseable to pain and has normal vital signs. Should I give her flumazenil (Romazicon) to wake her up?

No! Flumazenil is contraindicated in this patient. Flumazenil is a specific benzodiazepine receptor antagonist that reverses the sedative effects of clonazepam and other benzodiazepines, but is often unsafe to give. This patient might be taking clonazepam therapeutically for seizure control. Reversing clonazepam's effects using flumazenil could then induce seizures. If the patient is benzodiazepine-dependent, it is likely to precipitate withdrawal, which is characterized by seizures and sympathomimetic discharge. Flumazenil might also "unmask" a seizure from proconvulsant co-ingestants in a patient who has intentionally overdosed. If flumazenil is given and a seizure occurs, how should it be treated? The drug-of-choice would be a benzodiazepine but it cannot be given as the flumazenil renders it ineffective.

When would flumazenil be indicated? The patient who unintentionally overdoses only on a benzodiazepine (e.g. a child takes a family member's medicine) is a candidate to receive flumazenil.

TOXALERT

Toxalert is online!

Have you visited the Maryland Poison Center's website lately - www.mdpoison.com ? There you will find Toxalert and Toxtidbits as well as other information on the prevention and treatment of poisonings.

The Maryland Poison Center emails a reminder whenever a new issue of Toxalert or Toxtidbits is posted on our website. To receive this notice, send an email request to lbooze@rx.umaryland.edu .

Consider helping the poison center save money. If you receive Toxalert by mail and would like to view and print it from our website instead, or are receiving duplicate copies, send an email to lbooze@rx.umaryland.edu with your name, address and request.