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John H. Greve  
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Suspected Case of Loxoscelism (Spider-bite) in a Dog

Scott P. Taylor, BS, DVM*
John H. Greve, DVM, PhD**

INTRODUCTION
Loxoscelism is a disease caused by envenomation by spiders belonging to the genus Loxosceles. Loxoscelism (also known as “necrotic arachnidism” or “gangrenous spot”) has been mentioned as a disease in humans since the 1870's, but the etiological agent was not discovered until 1934. Since the 1930's there has been an abundance of material published on loxoscelism in humans in South America. However, this literature remained mostly unknown in North America until 1957, when a report implicated Loxosceles reclusa as the possible etiological agent of spider-bite in Missouri and other midwestern states. Subsequently a significant amount of research has been reported in the United States on the condition in humans, but no reports have been found in veterinary journals. The lack of reports in the veterinary literature may be responsible for loxoscelism being overlooked or misdiagnosed in animals.

The objective of this paper is to review the human literature on loxoscelism and to discuss a clinical case of suspected loxoscelism observed in a dog.

DISTRIBUTION AND PREVALENCE
Loxosceles reclusa, also known as the “fiddleback spider” or “violin spider” due to a violin-shaped marking on the cephalothorax (Fig 1), or the “brown recluse spider”, is a reclusive spider. It tends to hide in dark locations during the day and comes out to feed at night. In southern states it is found primarily outdoors under rocks, logs, and other secluded areas. However, in northern states it tends to seek the warmth of indoors, hiding in base-ments, clothing, bedding, and other out-of-the-way places.

L. reclusa is native to the United States, occurring primarily in the southern midwestern states, particularly Missouri, Arkansas, and Oklahoma. It also inhabits the southeastern states, and occasionally it is found in Iowa, Illinois, Indiana, Ohio, Arizona, and California.

SIGNS AND LESIONS
Envenomation by L. reclusa causes two different disease syndromes. It can either be manifested as a local cutaneous necrosis or as a systemic reaction.

Local reaction—Within the first 2 hours after the bite, a local inflammatory reaction with edema, erythema and possibly a small bulla or blister develops. Little or no pain is associated with this stage of the disease. After 2 hours the area around the bite becomes ischemic, which is the first clinical sign that is almost diagnostic for this syndrome. Ischemia results from the venom causing endothelial damage, which in turn causes formation of intravascular thrombosis. After 6–7 hours the lesion becomes blue to black due to local anoxia. During this time the lesion becomes hyperesthetic, with the pain most intense 2–8 hours after the bite. After 12–16 hours the lesion becomes necrotic, and at this time the lesion is anesthetic. Hemorrhage may also be present and is probably due to necrosis of the endothelium and vessel walls. The lesion may spread for a period lasting up to 6 days, and then in a week or two the skin and subcutaneous fat slough, leaving an ulcer 1–3 cm in diameter. This ulcer may take several weeks to a few months to heal, depending on the size of the lesion. These lesions usually leave extensive scarring if the ulcer is large.
Systemic reaction—The systemic syndrome can range from mild to fatal. Mild signs include fever, malaise, weakness, nausea, vomiting, and petechial hemorrhages. The more severe reactions are intravascular hemolysis, jaundice, hematuria, renal failure, and disseminated intravascular coagulation (DIC).\textsuperscript{1,2,3,4,5} Severe reactions are rare, but may occur in the young.

Fortunately severe systemic reactions are rare. Usually cases of loxoscelism in humans have only mild cutaneous reactions, including erythema, urticaria, and pruritus at the site of the bite lasting a few days.\textsuperscript{7} There is evidence that immunity occurs after exposure to the venom, making subsequent bites milder.\textsuperscript{8} It has been shown experimentally that rabbits produce antibodies against different antigens included in the venom of \textit{L. reclusa}.\textsuperscript{9}

**DIAGNOSIS**

Diagnostic tests have been developed\textsuperscript{4,7,8} specifically for loxoscelism. However, these tests can tell only if a patient has been sensitized, too late to aid in treatment specifically geared to loxoscelism. Diagnostic tests also are impractical and economically infeasible in veterinary clinical medicine. The veterinarian must rely on the history and the characteristic clinical signs to diagnose loxoscelism.

**THERAPY**

Several reports mention treatments for loxoscelism.\textsuperscript{3,5,7,10} Carefully monitoring the progression of the bite during the first 12 hours is essential for determining the appropriate therapy.\textsuperscript{10} Mild reactions may require only corticosteroids and/or antihistamines, while severe reactions may require surgical excision of the area involved. In either instance, the use of corticosteroids as soon as possible is recommended.

Corticosteroids will not prevent the formation of ulcers, but they will prevent some of the systemic complications, such as hemolysis and DIC, if given within the first 18 hours of the disease.\textsuperscript{5,7} A dose of 0.5 mg prednisone/kg/day is recommended in humans.\textsuperscript{10} This dose is given for 3 to 4 days and then reduced by 20% per day for the next 3 days.

Surgical excision is seldom indicated, since the majority of cases are mild. If ulcers appear, then skin grafting is recommended.

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**FIGURE 1**

Fig 1—\textit{Loxosceles reclusa} are usually 8 to 10mm in length, brownish colored, and have a purple-brown violin-shaped stigmatum on the dorsum of the cephalothorax.\textsuperscript{6} Photo courtesy of the Illinois Natural History Survey and the ISU Entomology Extension Service.

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CASE REPORT

On October 26, 1984, a 6-year-old, 40-lb., spayed female Brittany spaniel was brought to the hospital because of a swelling on its muzzle, left of the midline. The dog had been allowed outdoors to play and exercise. Three days before presentation, the clients noticed a swelling on the left side of the muzzle. The swelling progressed rapidly, and the Brittany became listless by the day of examination.

At the time of presentation, the swelling was approximately 8 cm in diameter and 4 to 6 cm thick. It was firm, erythematous at the periphery, and not painful. There were 2 necrotic centers only a few millimeters apart in the swelling. At this time the dog's temperature was 105.5°F, and she was mildly depressed.

On the second day of hospitalization, hematologic findings indicated an inflammatory response. Radiographs of the muzzle showed soft tissue swelling without bony involvement. A tentative diagnosis of loxoscelism was made. Differential diagnoses were trauma and infectious cellulitis.

Treatment consisted of corticosteroids and antibiotics. Dexamethasone (1 mg) and procaine penicillin (400,000 IU) were administered IM on the day of admission. A topical ointment containing 5 mg/g neomycin sulfate, 1 mg/g isoflupredone acetate, and 5 mg/g tetracaine hydrochloride was applied to the lesion.

After the second day of hospitalization the dog was sent home with 60 mg tetracycline, 60 mg novobiocin, and 1.5 mg prednisolone to be given orally 3 times a day for 4 days. For the next 3 days, 60 mg tetracycline and 60 mg novobiocin were given orally 3 times a day.

Five weeks later, the swelling on the muzzle had diminished, but a granulating ulcer about 3 cm in diameter remained in the center of the swollen area. The characteristic progression and the clinical signs in this case led us to believe that this was a case of loxoscelism in the canine.

CONCLUSION

Loxoscelism is not a commonly diagnosed problem in clinical practice. However, with ever increasing numbers of L. reclusa being observed, it is the responsibility of veterinarians to be aware of this disease. Veterinarians should determine if L. reclusa is present in their areas and learn to identify it. This is not only important for proper diagnosis and treatment of spider bites in pets, but it is also important from the standpoint of being able to advise clients about proper steps to take to protect themselves from the bite of the recluse spider.

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