

Lyme Disease Masquerading as Brown Recluse Spider Bite

From The Poison Control Center,* the Division of Emergency Medicine,[†] and the Division of Allergy, Immunology, and Infectious Diseases,[§] The Children's Hospital of Philadelphia, and the Department of Pediatrics, University of Pennsylvania School of Medicine,^{||} Philadelphia, PA.

Received for publication February 2, 2001. Revision received June 11, 2001. Accepted for publication July 19, 2001.

Reprints not available from the authors.

Address for correspondence: Kevin C. Osterhoudt, MD, Section of Medical Toxicology, Division of Emergency Medicine, The Children's Hospital of Philadelphia, 34th Street and Civic Center Boulevard, Philadelphia, PA 19104; 215-590-1959, fax 215-590-4454; E-mail osterhoudtk@email.chop.edu.

Copyright © 2002 by the American College of Emergency Physicians.

0196-0644/2002/\$35.00 + 0

47/1/119509

doi:10.1067/mem.2002.119509

Kevin C. Osterhoudt, MD*^{||}
Theoklis Zaoutis, MD^{§||}
Joseph J. Zorc, MD^{§||}

See related articles, p. 469 and p. 475, and editorial, p. 544.

We report a case of Lyme disease with clinical features resembling those described from brown recluse spider bites. The most striking manifestation was a necrotic skin wound. Brown recluse spider bites may be overdiagnosed in some geographic regions. Tick bite and infection with *Borrelia burgdorferi* should be considered in the differential diagnosis of necrotic arachnidism in regions endemic for Lyme disease.

[Osterhoudt KC, Zaoutis T, Zorc JJ. Lyme disease masquerading as brown recluse spider bite. *Ann Emerg Med.* May 2002;39:558-561.]

INTRODUCTION

The accurate diagnosis of spider bites can be difficult in cases in which no spider is recovered. Brown recluse spiders (*Loxosceles reclusa*) are notorious for their ability to cause necrotic skin wounds and are often blamed for such wounds even in the absence of brown recluse spiders. Many arthropods, including but not limited to other species within the *Loxosceles* genus, as well as many medical conditions, can cause necrotic skin wounds (Figure 1). Symptoms of one such illness, Lyme disease, may closely mimic the systemic symptoms of loxoscelism.

CASE REPORT

A previously healthy 9-year-old boy from suburban Philadelphia noted a small bump on his left scalp. By the next day, it had increased in redness, swelling, and tenderness, and the bump had become a small fluid-filled vesicle. That evening he developed fever, malaise, and "tingling" of the gums. He also reported ache in his knees without warmth, redness, or swelling. Within 2 days, he felt constitutionally better, but the scalp wound had worsened. The wound had become larger, and the center had scabbed and become necrotic. The patient recalled

no bites or traumatic injury, but his father reported chasing a “brown recluse spider” out of the kitchen 3 days before his son’s illness. On the fourth day of illness, he was referred to a tertiary care children’s emergency department for evaluation of the necrotic wound. The family brought several pages of medical information regarding the treatment of brown recluse spider bites, which they had downloaded from the Internet, with them to the ED.

The patient’s vital signs were blood pressure 107/68 mm Hg; pulse rate 80 beats/min; respiratory rate 14 breaths/min; and temperature 36.7°C (98.0°F). He was alert and calm. The sclera were anicteric, the pupils equal and reactive, and the extraocular muscles were functioning appropriately. No oral sores or pharyngeal inflammation was evident. On the left lateral scalp, superior and anterior to the ear, was a wound exhibiting the “red, white, and blue” or “bull’s-eye” characteristics commonly attributed to bites of the spider *L. reclusa*.¹ At the center was a 1.5-cm blue, necrotic ulcer with hair loss. This necrotic wound

was surrounded by an area of pallor, and an erythematous leading edge measured 3 × 4 cm. The lymph nodes inferior to the lesion and posterior to the sternocleidomastoid muscle were enlarged but were not tender. No heart murmur, inspiratory crackles, or expiratory wheezes were heard with auscultation. The abdomen was soft without organomegaly. The patient was normal neurologically, and no other rashes were noted. Laboratory values included: WBC count 9,400/mm³, hemoglobin 12.7 g/dL, platelets 231,000/mm³, carbon dioxide 22 mEq/L, blood urea nitrogen 12 mg/dL, and creatinine 0.5 mg/dL. Liver enzymes were within laboratory standards for age. A urinalysis demonstrated 5 to 10 RBCs/hpf. The appearance of the necrotic lesion, along with the history of spider exposure, led to a preliminary presumptive diagnosis of brown recluse spider bite. However, after further consideration of the epidemiology of loxoscelism, the family was given standard wound care instructions for the diagnosis of “probable arthropod bite.”

The patient returned to the ED on the eighth day of illness because of a worsening of symptoms. The erythematous perimeter was then 9 × 12 cm, and the central necrosis (now scabbed and less blue in color) measured 2 cm (Figure 2). The patient also reported the return of malaise, subjective fever, and intermittent arthralgia. At this visit, his WBC count was 10,100/mm³, and urinalysis exhibited trace blood with dipstick. Enzyme immunoassay findings for Lyme immunoglobulin G (IgG) antibodies were normal, but Lyme IgM optical density was 1.78

Figure 1.

Differential diagnosis of necrotic arachnidism.

- Envenomation from *Loxosceles* species
- Bites from other US spiders
 - T. agrestis* (hobo spider)
 - Phidippus* species (jumping spider)
 - Cheiracanthium* species (yellow sac spider)
 - Argiope aurantia* (orange argiope)
 - Lycosa* species (wolf spiders)
 - Peucetia viridans* (green lynx spider)
 - Dolomedes* species (fishing spider)
- Bites from other arthropods
- Impetigo/cellulitis
- Contact/chemical dermatitis
- Soft tissue trauma
- Lyme disease
- Anthrax
- Herpes simplex or varicella-zoster
- Toxic epidermal necrolysis
- Ecthyma gangrenosum
- Pyoderma gangrenosum
- Pyogenic granuloma
- Sporotrichosis
- Focal vasculitis
- Bedsore
- Diabetic ulcer
- Erythema nodosum
- Dermatitis of gonococcal arthritis
- Barbiturate blisters
- Warfarin-induced skin necrosis
- Periarteritis nodosum
- Lymphomatoid papulosis
- Tularemia
- Chagas disease

Figure 2.

Photograph of necrotic scalp wound on the eighth day of illness. Surrounding erythema migrans rash is now prominent (arrow).



(normal 0.0 to 0.8). The patient was treated with an oral antibiotic and felt well on follow-up at 2 weeks. The diagnosis of Lyme disease was confirmed with Western blot analysis. The scalp wound was barely perceptible 2 months after presentation. No brown recluse spiders were subsequently found in the household.

DISCUSSION

Necrotic skin lesions are frequently attributed to the bite of the brown recluse spider.² However, in Russell and Gertsch's study of more than 600 suspected spider bites, 80% were ultimately attributed to other arthropods, and 10% were attributed to other medical illnesses.³ A similar experience in Chile suggested that only 45% of presumed spider bites were inflicted by arthropods (17% linked to the *Loxosceles* genus), with 44% of cases resulting from infection and 11% caused by physical or chemical agents.⁴

Although *Loxosceles* species are not native to the Philadelphia region or to more northern areas of the eastern United States,⁵ wounds attributed to the brown recluse spider are frequently reported. It is possible that *Loxosceles* spiders may be encountered outside their native geographic range, as they may be carried by commercial or residential transport. Although they may sometimes flourish in environments protected from wintering, such as basement enclaves, they are not expected to populate the environmentally harsh northeastern United States.² In regions where *Loxosceles* species are not endemic, reports of brown recluse spider bites are thought to be exaggerated.⁵ A similar situation has occurred in the Pacific Northwestern United States (another nonendemic habitat for *Loxosceles* species), where another spider, *Tegeneria agrestis*, was ultimately implicated.⁶ Confirmatory diagnostic testing techniques for *Loxosceles* envenomation have been developed^{7,8} but are not widely available for clinical use.

Although most brown recluse spider bites are only mildly symptomatic, the classic clinical presentation of envenomation from *L. reclusa* is characterized by local dermonecrosis. The initial bite may sting or be unnoticed. A few hours after envenomation an erythematous blister or papule may form and may progress to an eschar or necrotic ulcer during the next 1 to 4 days. Brown recluse spider envenomation is infrequently accompanied by systemic symptoms such as fever, malaise, erythroderma, and joint pain.⁹ In the most severe cases, hemolytic anemia, thrombocytopenia, and their resultant complications may develop 1 to 3 days after the bite.¹⁰

The clinical manifestations of the early localized stage of Lyme disease include similar constitutional ailments

such as fever, malaise, arthralgia, and a typical annular rash known as erythema migrans. Erythema migrans usually occurs 7 to 14 days after tick bite but may be seen in as few as 3 days. This rash begins as a macule or papule and expands over 24 to 48 hours to become a round erythematous or target lesion several centimeters in diameter. Because necrosis and ulceration are not uncharacteristic of erythema migrans,¹¹ these signs and symptoms of Lyme disease may be confused with those caused by loxoscelism. Similarities between erythema migrans and necrotic arachnidism have stimulated speculation that patients with Lyme disease may have been erroneously treated with dapsone.¹² One prior report describes 2 cases of Lyme disease misdiagnosed as brown recluse spider bites.¹³ We believe that the return of fever, malaise, and arthralgia to our patient on the eighth day of rash was not consistent with the clinical course of brown recluse spider bite.

It has been suggested that, in circumstances in which a spider is not captured close to the site of injury at the time that the envenomation occurred, the term "probable arthropod envenomation" be used if other medical causes of "necrotic arachnidism" have been excluded.¹⁴ This is especially true in areas in which brown recluse spiders are not endemic. We prefer the term "probable arthropod bite" because it is often unclear whether the necrotic lesion results from true envenomation, secondary infection, or reaction to saliva or retained mouth parts. More than 90% of cases of Lyme disease within the United States are reported from the northeast and north central states,¹⁵ in regions that are not expected to be endemic for *Loxosceles* spiders. Lyme disease may be an important consideration in the differential diagnosis of necrotic skin wounds in regions where *Ixodes* ticks are highly prevalent.

We thank Richard Vetter, MS, Department of Entomology, University of California—Riverside, Riverside, CA, for sharing his expertise with the authors in the preparation of this manuscript.

REFERENCES

1. Ronge LJ. Spider bites can be more than a nuisance. *Infect Dis Child.* 1996;9:21-23.
2. Vetter R. Identifying and misidentifying the brown recluse spider. *Dermatol Online J.* 1999;5:7.
3. Russell FE, Gertsch WJ. For those who treat spider or suspected spider bites. *Toxicol.* 1983;21:337-339.
4. Schenone H. Diagnosis in 1348 patients which consulted for a probable spider bite or insect sting. *Bol Chil Parasitol.* 1996;51:20-27.
5. Vetter RS. Myth: idiopathic wounds are often due to the brown recluse or other spider bites throughout the United States. *West J Med.* 2000;173:357-358.
6. Necrotic arachnidism—Pacific Northwest, 1988-1996. *MMWR Morb Mortal Wkly Rep.* 1996;45:433-436.

LYME DISEASE AND SPIDER BITES

Osterhoudt, Zaoutis & Zorc

-
7. Barrett SM, Romine-Jenkins M, Blick KE. Passive hemagglutination inhibition test for diagnosis of brown recluse spider bite envenomation. *Clin Chem*. 1993;39:2104-2107.
 8. Miller MJ, Gomez HF, Snider RJ, et al. Detection of loxosceles venom in lesional hair shafts and skin: application of a specific immunoassay to identify dermonecrotic arachnidism. *Am J Emerg Med*. 2000;18:626-628.
 9. Wasserman GS, Anderson PC. Loxoscelism and necrotic arachnidism. *J Toxicol Clin Toxicol*. 1983-84;21:451-472.
 10. Knapp JF, Thomas KR, Mathews R, et al. Case 06-1994: a 10-year-old female with fever, jaundice, and orthostatic hypotension. *Pediatr Emerg Care*. 1994;10:364-368.
 11. Malane MS, Grant-Kels J, Feder HM, et al. Diagnosis of lyme disease based on dermatologic manifestations. *Ann Intern Med*. 1991;114:490-498.
 12. Nadelman RB, Wormser GP. Erythema migrans and early lyme disease. *Am J Med*. 1995;98(suppl 4A):S15-S24.
 13. Rosenstein ED, Kramer N. Lyme disease misdiagnosed as a brown recluse spider bite [letter]. *Ann Intern Med*. 1987;107:782.
 14. Blackman JR. Spider bites. *J Am Board Fam Pract*. 1995;8:288-294.
 15. Availability of Lyme disease vaccine. *MMWR Morb Mortal Wkly Rep*. 1999;48:35-43.