Emergency Department Death From Systemic Loxoscelism

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Systemic loxoscelism is a constitutional illness resulting from the bite of the brown recluse spider. In severe form, it may cause hemolysis, acute renal failure, and disseminated intravascular coagulation. More rarely, it may result in death. We report an unusual case of systemic loxoscelism resulting in death less than one day following envenomation. We also discuss screening algorithms and contemporary management of systemic loxoscelism. [Ann Emerg Med. 2012;60:439-441.]

INTRODUCTION

Systemic loxoscelism can be life threatening. The initial clinical presentation does not necessarily predict the severity of illness. We present an unusually rapid death after a brown recluse bite because of massive hemolysis and disseminated intravascular coagulation. Though significant morbidity is rare after brown recluse spider bites, an aggressive approach to patients with systemic symptoms is required.

CASE REPORT

A 3-year-old previously healthy girl presented to a rural emergency department (ED) after an apparent spider bite. A few hours before, the grandmother saw a small brown “fiddle-back” spider on the right side of her chest. They were removing an old blanket out of storage at the time of injury. The patient was evaluated and discharged from that ED the same evening. After returning home, approximately 6 hours after the bite, she developed fever to 39.3°C (102.8°F) and was administered acetaminophen. The following morning, approximately 12 hours after the bite, she awoke with nausea, vomiting, malaise, and increased pain at the site. Approximately the same time, her parents noticed that her urine appeared “tea colored” (Figure).

The patient presented to our urban children’s ED approximately 15 hours after the bite. Her vital signs were blood pressure 119/72 mm Hg, pulse rate 155, respiratory rate 24 breaths/min, oral temperature 38.3°C (100.9°F), and oxygen saturation 97% on room air. Physical examination revealed tachycardia and a 5-×-7-cm patch of nonblanching erythema and induration on her right breast (Figure), with a 2-mm hemorrhagic vesicle in the right upper aspect of the lesion. There was no necrosis or purpura. She had multiple, small erythematous papules in various stages of healing on her trunk and extremities. There was no diffuse or organized eruption besides that on the breast.

Her abdomen was nontender, and the remainder of the physical examination was normal.

The patient lived with her mother and father in rural middle Tennessee. Her family attributed the aforementioned papules to multiple recent insect exposures, which included ticks. They denied any travel outside of middle Tennessee or any exposure to pets. The family also denied any patient complaint of chest pain, dyspnea, or abdominal pain.

A venous blood gas result on arrival revealed a pH of 7.37, pCO₂ 39, pO₂ 22, base excess −2.6, glucose level of 86, hematocrit level of 28%, and lactate level of 2.2. Urine dip of a specimen brought from home showed hematuria. Intravenous access was secured, toxicology and critical care consultations were requested, and additional laboratory studies were ordered. Her WBC count was 20,700/µL (90% neutrophils, 7% lymphocytes, and 2% monocytes), hemoglobin 9.5 g/dL, hematocrit level of 26%, and platelets 54,000/µL. Peripheral smear showed 2 or greater spherocytes. The patient’s blood type was A+/antibody screen negative, and the direct antiglobulin
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(Coombs) test result was negative. Prothrombin time was 19.8 seconds, international normalized ratio 1.8, and partial thromboplastin time 40.2 seconds. A comprehensive metabolic panel was ordered, but results were not reported because of hemolysis. Because of anemia and evidence of hemolysis, cross-matched packed RBCs were ordered and transfusion was begun less than 3 hours from patient arrival. Before initiation of transfusion, 20 mL/kg of normal saline solution, 1 mg of morphine, and 2 mg of ondansetron had been administered.

During the blood transfusion, the patient received continuous telemetry in typical fashion. She was persistently tachycardic, with pulse rate between 150 and 160 mm Hg. Just over 1 hour after initiation of transfusion, she became apneic and pulseless. Her initial arrest rhythm was ventricular fibrillation. The patient underwent 40 minutes of aggressive resuscitation, including intubation, multiple rounds of defibrillation and epinephrine, central line placement, and massive blood product transfusion (6 units packed RBCs, 1 unit fresh frozen plasma, and 1 pack platelets). Significant hemorrhage from patient’s femoral access sites, rectum, vagina, and endotracheal tube worsened despite blood product administration. A venous blood gas result obtained during the resuscitation revealed profound acidosis and an undetectable hematocrit level. A bedside echocardiogram failed to show any diastolic filling or systolic function. Despite our resuscitative efforts, the patient did not regain a sustainable pulse. She was pronounced dead fewer than 5 hours after presentation to our ED and just over 19 hours after the bite. Blood bank investigation did not reveal any evidence of blood product incompatibility or transfusion reaction. Autopsy was requested and findings were consistent with systemic loxoscelism.

DISCUSSION

In 2008, 1,564 brown recluse spider bites were reported in the United States. Most of these occurred in the Southeast and southern Midwest.1 Brown recluse spiders (Loxosceles reclusa) are usually less than 1 inch long and are light to medium brown. They often have a fiddle-shaped marking on the dorsum of the thorax.2 Their name comes from a tendency to hide in dark places, such as closets, basements, or garages. Humans most often encounter these spiders when they accidentally disturb their habitats.3

Envenomation can cause a stinging sensation, though some patients are initially unaware of the bite. Ecchymosis may develop central to the lesion, followed by a rim of pallor and yet another rim of erythema. This “red, white, and blue sign” is classic for L reclusa envenomations but is not always present. When constitutional symptoms develop, they are termed systemic loxoscelism. These constitutional symptoms may include fever, malaise, nausea, vomiting, rash, myalgias, arthralgias, seizures, or altered mental status. Systemic loxoscelism more commonly occurs in pediatric, geriatric, and immunocompromised patients. Severe cases may progress to develop hemolysis, renal failure, and disseminated intravascular coagulopathy. Constitutional symptoms typically begin 48 hours or more after the bite. Oliguria and hematuria are often the first warning signs of severe disease.4

The most significant morbidity in systemic loxoscelism results from hemolysis and coagulopathy. The underlying cause of hemolysis is not fully understood, but sphingomyelinase D, a component of the toxin, has been shown to have a central role in the process.5,6 Recent literature suggests that it causes both direct toxin-related hemolysis and complement-mediated erythrocyte destruction7,8

Our patient had systemic loxoscelism, according to the witnessed envenomation, wound appearance, and classic symptoms. Other diagnoses, such as MRSA sepsis, Rocky Mountain spotted fever, and other tick-borne illnesses, were considered less likely, given this compelling history, appearance, and disease course.

This case is unique in the rapidity with which systemic loxoscelism evolved. Constitutional symptoms were evident within 6 hours of the bite. On presentation to our ED, the patient had hematuria, anemia, and thrombocytopenia. She developed disseminated intravascular coagulopathy and shock within 19 hours of the bite. Such an early and rapid evolution of disease is uncommon, according to our review of the literature.9-12

Many treatments have been proposed for systemic loxoscelism, including steroids, dapsone, and antibiotics.2 However, no single treatment has been proven to demonstrate a mortality benefit. Dapsone can independently cause hemolysis, therefore confounding and possibly exacerbating the clinical course. This therapy, once common, is no longer widely recommended.13,14 Given the potential for life-threatening complications, early transfusion of blood products should be considered in the setting of hemolysis.

We present this case to describe the typical characteristics of systemic loxoscelism and to highlight the unusually early and rapid progression of disease in this patient. Although most brown recluse spider bites result only in a cutaneous lesion, there are potentially life-threatening complications of systemic illness, particularly in children. In a well-appearing patient, we suggest that the clinician screen for systemic illness by testing for hematuria. In a patient who already demonstrates systemic symptoms, further investigation is required to rule out hemolysis, renal failure, and disseminated intravascular coagulopathy. Clinical toxicology or poison center consultations are helpful in the management of suspected or confirmed systemic loxoscelism. Alternative diagnoses should be considered in areas outside the normal geographic distribution of L reclusa.

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REFERENCES


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