



CASE REPORT

The Danger of Diagnostic Error: Community-Acquired MRSA or a Spider Bite?

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Introduction

In today's world of medicine, the state of the art for diagnosis has reached levels of accuracy never dreamed. Nevertheless, diagnostic error still is encountered frequently. Regardless of whether the diagnosis is made based on clinical evaluation, imaging, or laboratory studies, when the diagnosis is wrong, patient injury can result. This report describes a case of methemoglobinemia after starting dapsone for a presumed spider bite.

Case Report

A previously healthy 23-year-old female presented to her primary care physician for evaluation of a progressively enlarging lesion on the pre-tibial space of her right lower leg (see Figure 1). She noticed the lesion five days prior to presentation. The lesion steadily enlarged and began to ooze blood and frank pus over the prior two days.

The patient was started on dapsone, the combination of sulfamethoxazole and trimethoprim, and prednisone for a presumed spider bite. Two days after starting the treatment, the patient returned to the clinic complaining of shortness of breath during routine daily activities and significant bi-frontal headaches. Lip cyanosis and a draining carbuncle over the

right pre-tibial space was noted on physical exam. Her vitals revealed a pulse oximetry of 88% on room air. Otherwise, the vital signs and physical findings were normal. A complete blood count also was normal. The patient was transferred to the hospital for further evaluation of the hypoxia.

On admission, the patient had a temperature of 98.2F, a blood pressure of 134/78, a pulse of 82, a respiration rate of 24, and an oxygen saturation of 89% on room air. The physical findings were similar to those in the office exam.

There was no scleral icterus and lungs were clear to auscultation. Arterial blood gas on room air, done simultaneously with pulse oximetry, showed a pH of 7.47, a partial pressure of carbon dioxide of 29, a partial pressure of oxygen of 107, and an oxygen saturation of 99%. The methemoglobin level was 16.3% with normal being less than 1.5%.

The wound culture from the lesion grew methicillin-resistant *Staphylococcus aureus* (MRSA) with a susceptibility pattern consistent with community-acquired MRSA. The patient was treated with methylene blue one mg/kg, intranasal mupirocin calcium ointment, and chlorhexidine gluconate showers. Recovery was uneventful.



Figure 1. Lesion on the pre-tibial space of the right lower leg of the patient case.

Discussion

Spider bites occur, but they are the exception, not the rule. Over-diagnosis of brown recluse spider (*Loxosceles reclusa*) bites has led to harmful sequelae and misdiagnosis of other common and uncommon dermonecrotic wounds.¹⁻² Skin lesions resembling bites of brown recluse spiders can have many different etiologies. They can be caused by infections (bacterial, fungal, viral), inflammatory and metabolic diseases (diabetic ulcer, pyoderma gangrenosum, erythema multiforme), or arthropods either directly (ticks, fleas) or as vectors (Lyme borreliosis, flea-borne diseases).³⁻⁴ Improper diagnoses of spider bites have been given to patients with cutaneous anthrax, lymphoma, basal cell carcinoma, Lyme borreliosis, pyoderma gangrenosum, and other serious and potentially debilitating or deadly conditions.⁴

Spiders frequently are blamed for causing skin disease incidents based completely on speculative, unsubstantiated associations and historical prejudice. In almost every case, no spider is seen biting



Figure 2. Lesion of a brown recluse spider bite.

or is collected in the incident.⁵⁻⁶ Many patients present with a “spider bite”, assumed because of “how bad it looks”, but on investigation they have community-acquired MRSA (CA-MRSA). When spiders are blamed, medical and entomological personnel divert their efforts onto the wrong remedial pathway and delay the correct assessment of the situation.⁷

In the United States, brown recluse spiders are endemic only in the southwest and midwest.¹ Brown recluse spiders are not present in vast regions of the country, such as the Pacific Northwest. In such locales, it also is difficult to find a black widow spider, thus making the diagnosis of a spider bite highly unlikely.⁸

In North America, brown recluse spiders are the only spiders that are proven to cause dermonecrotic lesions.⁴ These spider bites manifest as single lesions in a given patient (see Figure 2). Most bites heal well with no or minimal medical intervention. Most bites heal without noteworthy scarring.⁷ In a diagnostic situation, a caregiver almost always can

rule out a spider bite when there are multiple contemporaneous lesions on one person, multiple consecutive lesions on one person, or multiple persons with lesions.⁹

The infamy of this spider is exaggerated in part due to the tendency of the medical community to emphasize lesions with severe necrosis, which are rare manifestations of venom insult.⁴ In addition, there is an epidemic of skin lesions infected with CA-MRSA; many may have originated in pruritic bites and stings, or in other puncture wounds that eventually necrose and can mimic necrotic arachnidism.¹⁰ Most CA-MRSA infections are mild, but some advance to more serious systemic infection, bacteremia, and death.¹¹

CA-MRSA infections with secondary familial transmission have been described in some reports.¹² Obtaining the proper diagnosis of a CA-MRSA infection is important because misdiagnosis and delay of proper treatment can have serious consequences for both the patient and the medical community.

Conclusion

The diagnosis of brown recluse bites is overused. This case demonstrated the ease with which patients and clinicians can confuse spider bites with other necrotic skin lesions, especially MRSA skin lesions. A diagnosis of a brown recluse spider bite should be made after careful consideration is given to other possible diagnoses, especially if the patient is not within the region endemic to the brown recluse spider.

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