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Selected Topics: Toxicology

LATRODECTUS FACIES AFTER *LATRODECTUS HESPERUS* ENVENOMATION IN A PEDIATRIC PATIENT

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☐ **Abstract—Background: Black widow spider (*Latrodectus* spp) envenomation represents the most medically significant spider envenomation in the United States, prompting more than 2500 calls to poison centers annually. The female spider, which is responsible for symptomatic envenomations, is classically described as a shiny black spider with a red hourglass-shaped marking on the ventral abdomen. Clinical features of envenomation include painful muscle cramping, abdominal pain, and autonomic disturbances, such as tachycardia, hypertension, and diaphoresis. "*Latrodectus* facies" or "facies latrodectismica" is an additional distinctive but rarely described clinical finding characterized by periorbital edema, lacrimation, and blepharospasm. Case Report: A 6-year-old female developed the typical clinical features of *Latrodectus* envenomation after being found in bed with a Western black widow spider (*Latrodectus hesperus*) with no ventral marking. She initially improved with opioid analgesia, but 6 h later her symptoms worsened again, and concurrent with this worsening she developed *Latrodectus* facies. She received additional opioid analgesia and all her symptoms resolved within 24 h. Her mother provided informed and written consent for the acquisition and publication of the facial photographs presented. Why Should an Emergency Physician Be Aware of This?: A high degree of clinical suspicion is necessary to correctly diagnose *Latrodectus* envenomation, especially when the spider escapes unnoticed or in young children in whom the bite is not witnessed. To our knowledge, *Latrodectus* facies has not been reported previously in a young child, and recognition of this finding will aid clinicians in limiting unnecessary interventions and administering appropriate therapy.**

☐ **Keywords—*Latrodectus*; black widow; spider; envenomation**

INTRODUCTION

Latrodectus species, commonly known as black widow spiders, have a worldwide distribution and are responsible for the most clinically significant spider envenomation in the United States, where they are found in every state except Alaska (1,2). More than 2500 envenomations are reported to U.S. poison centers annually, with the frequency of envenomations increasing throughout the year until they peak in the early autumn and subsequently decline until the following spring (1). The female spider is thought to be responsible for virtually all symptomatic envenomations; the male spider is considerably smaller, with fangs that are generally not large enough to penetrate human skin. The female spider is shiny black in color with a large round abdomen and is typically described as having a bright red hourglass-shaped marking on the ventral abdomen (2). The bite of the black widow spider may result in a pinprick sensation, although for many patients the bite itself goes unnoticed (3). Because these

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envenomations do not produce local tissue injury, the skin findings are often subtle and may only consist of a tiny puncture wound or a faint erythematous halo (3,4).

Envenomated patients gradually develop painful muscle cramps and spasms that can occur near the bite site or in distant muscle groups. Other clinical features, such as fasciculations, abdominal pain, and autonomic disturbances, including tachycardia, hypertension, and diaphoresis, are common, while mortality is extremely rare (1,3,4). An additional clinical phenomenon known as "*Latrodectus* facies" or "facies latrodectismica" has been described occasionally in envenomated older children and adults and is characterized by the development of periorbital edema, lacrimation, and blepharospasm (3,5). We present a case of a 6-year-old female who developed typical features of *Latrodectus* envenomation, as well as *Latrodectus* facies after envenomation by a Western black widow spider (*Latrodectus hesperus*) without any ventral markings.

CASE REPORT

A 6-year-old female with mild intermittent asthma presented to an emergency department after she went to bed in her normal state of health and woke up acutely with right flank pain. Her mother heard the child moaning in bed and upon pulling back the sheets to better assess her, discovered a shiny black spider in her bed, which she killed and saved. The child was complaining of right flank and abdominal discomfort and appeared to be writhing in pain, prompting her mother to bring her to the emergency department for evaluation.

Upon presentation, the child's vital signs were notable for a temperature of 36.2°C, heart rate of 119 beats/min, respiratory rate of 40 breaths/min, and blood pressure of 112/70 mm Hg. Within 30 min her heart rate and blood pressure had increased to 152 beats/min and 133/86 mm Hg, respectively. She was complaining of diffuse extremity myalgias, muscle cramping, and abdominal pain. On physical examination, she appeared uncomfortable and was noted to be writhing in bed. She had no appreciable facial swelling and her cardiopulmonary examination was remarkable only for tachycardia and tachypnea. Her abdomen was rigid but not distended or tender to palpation. Her skin was notable for two pink punctate lesions surrounded by a thin, faint, slightly erythematous halo with central clearing on her right flank. The remainder of her examination was unremarkable, as was a basic metabolic panel and urinalysis.

The patient was initially treated with a 0.5 mg/kg i.v. dose of ketorolac and a 0.1 mg/kg i.v. dose of lorazepam without significant improvement. After consultation with the medical toxicology service, a 0.1 mg/kg i.v. dose of morphine was administered with subsequent marked improvement in the patient's pain. The medical toxicology service discussed the risks and benefits of antivenin administration with the patient's mother, including the risk of a hypersensitivity reaction, and the patient's mother preferred to avoid antivenin administration, given the child's history of asthma and her improvement after morphine.

Approximately 6 h later, the patient's myalgias and abdominal pain began worsening again, and she was noted to have new bilateral periorbital edema and blepharospasm (Figure 1). Her conjunctiva were clear and she had no wheezing, urticaria, or angioedema apparent on repeat examination. Her vital signs at that time included a temperature of 37.8°C, a heart rate of 145 beats/min, an improved respiratory rate of 22 breaths/min, and a blood pressure of 146/88 mm Hg. A repeat basic metabolic panel at that time was again unremarkable; her serum albumin at that time was 4.5 g/dL. An oral dose of 1 mg/kg diphenhydramine was administered without improvement. An i.v. fluid bolus of 20 mL/kg normal saline was administered in addition to a 0.1 mg/kg oral dose of oxycodone, which did not adequately control her pain, so the patient was admitted for further symptomatic management. She ultimately required one further dose of i.v. analgesia with morphine, after which she was successfully transitioned to oral analgesia with oxycodone and acetaminophen.

Figure 1. *Latrodectus* facies. Periorbital edema and blepharospasm, also known as *Latrodectus* facies, appeared approximately 6 h after presentation.

The following morning, the patient's periorbital edema and blepharospasm had resolved, her vital signs had normalized, and she was discharged home without opioid analgesia (Figure 2). The patient's family brought in the dead spider, which was found to have the typical physical characteristics of black widow spiders except for the notable absence of any ventral markings (Figure 3).

DISCUSSION

The vertebrate-specific toxin in *Latrodectus* venom is α-latrotoxin, which is thought to bind to a variety of presynaptic receptors, resulting in both calcium influx leading to acetylcholine and norepinephrine release, as well as calcium-independent neurotransmitter release (2). This massive neurotransmitter release manifests clinically as painful muscle spasms and autonomic disturbances, including tachycardia, hypertension, and diaphoresis. The diagnosis of black widow spider envenomation may be difficult to make, as these clinical findings are nonspecific, the skin findings are subtle, and the spider bite itself may go unnoticed. Abdominal wall spasms and rigidity may be severe enough to mimic an acute abdomen, and chest pain from muscle spasms may be mistaken for a myocardial infarction in envenomated adults (3,4). The typical clinical course involves a waxing and waning of symptoms over 24–48 h, with virtually all patients experiencing complete resolution of symptoms by 72 h after envenomation (4).

Figure 2. Resolution of *Latrodectus* facies. Latrodectus facies resolved approximately 24 h after it appeared.

Figure 3. *Latrodectus hesperus* specimen. The ventral aspect of the spider found in the patient's bed lacked any marking on the abdomen.

Our patient developed these classic symptoms of envenomation in addition to a rarely described phenomenon of periorbital edema and blepharospasm known as "*Latrodectus* facies" or "facies latrodectismica." In older children and adults, this phenomenon has also been associated with grimacing and masseter trismus, rhinitis, and conjunctivitis; to our knowledge *Latrodectus* facies has not been described previously in a young child (3,5,6). Some authors have noted that reports of patients who develop *Latrodectus* facies originate primarily in Europe, implying that this clinical manifestation may only occur after envenomation by certain species in a certain geographic distribution (7). There have been several cases reported in Central America, however, and our patient was envenomated in Colorado and had not had any recent travel, suggesting that perhaps the species and geographic specificity of this clinical manifestation after envenomation may not be as limited as previously thought (5). The mechanism underlying the development of *Latrodectus* facies has not been elucidated; other sites of edema are not described after *Latrodectus* envenomation. Some authors have suggested that the mechanism could be neurogenic in nature, given the known effects that α-latrotoxin has on neurotransmitter release (5). Our patient did not have any other laboratory abnormalities, such as hypoalbuminemia or proteinuria, to otherwise explain the development of periorbital edema, and all of her clinical findings, including her facial findings, resolved within 24 h.

The management of *Latrodectus* envenomation includes i.v. administration of benzodiazepines and opioid

analgesia. There is an equine-derived whole IgG antivenin available that is highly effective at rapidly reversing the clinical manifestations of toxicity (4). While the majority of the clinical experience with the antivenin has demonstrated its safety, there have been reports of serious hypersensitivity reactions, including two fatal anaphylactoid reactions, both of which occurred in patients with asthma (4,8,9). As such, some providers prefer to manage patients with opioids and benzodiazepines and reserve antivenin therapy for those who fail symptomatic management. Of note, a small phase 2 trial for an equine-derived F(ab)2 *Latrodectus* antivenin demonstrated a similar adverse effect profile to placebo and did not demonstrate any severe adverse events, while significantly reducing the time to achieve pain relief, though the antivenin did not achieve overall greater pain reduction compared to placebo (6). While there were patients enrolled in this study who developed *Latrodectus* facies prior to receiving antivenin, the authors do not comment on the time course of facies resolution or on whether any patients developed *Latrodectus* facies after antivenin administration. Given the rapidity with which the other clinical manifestations of *Latrodectus* envenomation resolve after antivenin administration, we hypothesize that *Latrodectus* facies may also resolve more quickly in patients who receive antivenin compared to those who do not. However, given that all of the clinical manifestations of *Latrodectus* envenomation, including *Latrodectus* facies, eventually resolve even without antivenin administration, we do not believe *Latrodectus* facies in and of itself is an indication for antivenin administration.

Interestingly, the spider found in the child's bed had the typical characteristics of black widow spiders, including a shiny black body and a large rounded abdomen, but it lacked any ventral marking. A local invertebrate zoologist (Paula E. Cushing, PhD, written communication, September 2018) identified the spider as most likely a Western black widow (*L. hesperus*), the only black widow species found in our state, based on photos of the specimen and a description of the patient's clinical presentation. She noted that while rare, there have been other *L. hesperus* specimens collected that lack any ventral markings.

In conclusion, *Latrodectus* envenomation is clinically characterized by painful muscle spasms and autonomic disturbances, and the clinical presentation may include *Latrodectus* facies in young children as well as adults. A high level of clinical suspicion is necessary to make the correct diagnosis and limit unnecessary interventions, and the lack of a ventral marking on an implicated spider should not preclude the diagnosis of *Latrodectus* envenomation.

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

Correctly diagnosing *Latrodectus* envenomation is challenging because many of the clinical findings are nonspecific and the spider bite itself may go unnoticed. *Latrodectus* facies is a distinctive clinical finding in both adults and young children that will aid in making the diagnosis, ensuring the timely delivery of appropriate therapy while limiting unnecessary interventions. Emergency physicians should also be aware that some *Latrodectus* spiders in the United States do not have a ventral marking but can still envenomate.

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