

What's Eating You? The South African Fattail Scorpion Revisited

Henry Tomlinson, MD; Dirk M. Elston, MD

PRACTICE POINTS

- Exotic and dangerous pets are becoming more popular. Scorpion stings cause potentially life-threatening neurotoxicity, with children particularly susceptible.
- Fattail scorpions are particularly dangerous and physicians should be aware that their stings may be encountered worldwide.
- Symptoms present 1 to 8 hours after envenomation, with severe cases showing hyperreflexia, clonus, difficulty swallowing, and respiratory distress. The sting site may be unimpressive.

Worldwide, there are more than 3250 deaths a year related to scorpion stings. With the increasing popularity of exotic and dangerous pets, American physicians are more likely to see exotic scorpion envenomations. Although adults are stung more often, children experience more severe envenomation.

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Identification

The South African fattail scorpion (*Parabuthus transvaalicus*) (Figure) is one of the most poisonous scorpions in southern Africa.¹ A member of the *Buthidae* scorpion family, it can grow as long as 15 cm and is dark brown-black with lighter red-brown pincers. Similar to other fattail scorpions, it has slender pincers (pedipalps) and a thick square tail (the telson). *Parabuthus transvaalicus* inhabits hot dry deserts, scrublands, and semiarid regions.^{1,2} It also is popular in exotic pet collections, the most common source of stings in the United States.

Stings and Envenomation

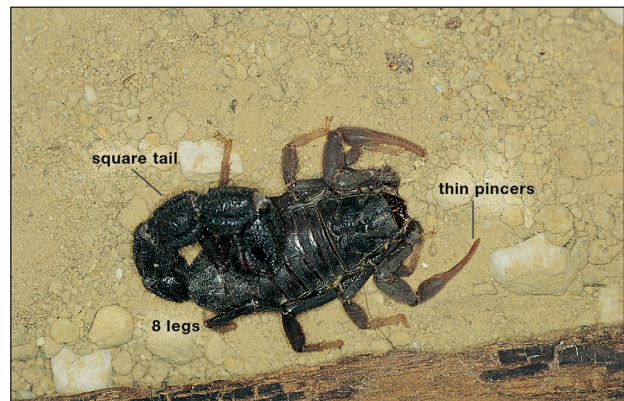
Scorpions with thicker tails generally have more potent venom than those with slender tails and thick pincers. Venom is injected by a stinger at the tip of the telson¹;

P transvaalicus also can spray venom as far as 3 m.^{1,2} Venom is not known to cause toxicity through skin contact but could represent a hazard if sprayed in the eye.

Scorpion toxins are a group of complex neurotoxins that act on sodium channels, either retarding inactivation (α toxin) or enhancing activation (β toxin), causing massive depolarization of excitable cells.^{1,3} The toxin causes neurons to fire repetitively.⁴ Neurotransmitters—noradrenaline, adrenaline, and acetylcholine—cause the observed sympathetic, parasympathetic, and skeletal muscle effects.¹

Incidence—Worldwide, more than 1.2 million individuals are stung by a scorpion annually, causing more than 3250 deaths a year.⁵ Adults are stung more often, but children experience more severe envenomation, are more likely to develop severe illness requiring intensive supportive care, and have a higher mortality.⁴

As many as one-third of patients stung by a *Parabuthus* scorpion develop neuromuscular toxicity, which can be life-threatening.⁶ In a study of 277 envenomations by *P transvaalicus*, 10% of patients developed severe



The South African fattail scorpion (*Parabuthus transvaalicus*).

From the Department of Dermatology and Dermatologic Surgery, Medical University of South Carolina, Charleston.

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Correspondence: Henry Tomlinson, MD, 2194 Parkway Dr, Charleston, SC 29412 (tomlinsonhenry@gmail.com).

symptoms and 5 died. Children younger than 10 years and adults older than 50 years are at greatest risk for adverse outcomes.⁶ Children have a case fatality rate as high as 10 times the adult fatality rate.⁷

Clinical Presentation—The clinical presentation of scorpion envenomation varies with the species involved, the amount of venom injected, and the victim's weight and baseline health.¹ Scorpion envenomation is divided into 4 grades based on the severity of a sting:

- Grade I: pain and paresthesia at the envenomation site; usually, no local inflammation
- Grade II: local symptoms as well as more remote pain and paresthesia; pain can radiate up the affected limb
- Grade III: cranial nerve or somatic skeletal neuromuscular dysfunction; either presentation can have associated autonomic dysfunction
- Grade IV: both cranial nerve and somatic skeletal neuromuscular dysfunction, with associated autonomic dysfunction

The initial symptom of a scorpion sting is intense burning pain. The sting site might be unimpressive, with only a mild local reaction. Symptoms usually progress to maximum severity within 5 hours.¹ Muscle pain, cramps, and weakness are prominent. The patient might have difficulty walking and swallowing, with increased salivation and drooling, and visual disturbance with abnormal eye movements. Pulse, blood pressure, and temperature often are elevated. The patient might be hyperreflexic with clonus.^{1,6}

Symptoms of increased sympathetic activity are hypertension, tachycardia, cardiac dysrhythmia, perspiration, hyperglycemia, and restlessness.^{1,2} Parasympathetic effects are increased salivation, hypotension, bradycardia, and gastric distension. Skeletal muscle effects include tremors and involuntary muscle movement, which can be severe. Cranial nerve dysfunction may manifest as dysphagia, drooling, abnormal eye movements, blurred vision, slurred speech, and tongue fasciculations. Subsequent development of muscle weakness, bulbar paralysis, and difficulty breathing may be caused by depletion of neurotransmitters after prolonged excessive neuronal activity.¹

Distinctive Signs in Younger Patients—A child who is stung by a scorpion might have symptoms similar to those seen in an adult victim but can also experience an extreme form of restlessness that indicates severe envenomation characterized by inability to lay still, violent muscle twitching, and uncontrollable flailing of extremities. The child might have facial grimacing, with lip-smacking and chewing motions. In addition, bulbar paralysis and respiratory distress are more likely in children who have been stung than in adults.^{1,2}

Management

Treatment of a *P transvaalicus* sting is directed at "scorpionism," envenomation that is associated with systemic symptoms that can be life-threatening. Treatment

comprises support of vital functions, symptomatic measures, and injection of antivenin.⁸

Support of Vital Functions—In adults, systemic symptoms can be delayed as long as 8 hours after the sting. However, most severe cases usually are evident within 60 minutes; infants can reach grade IV as quickly as 15 to 30 minutes.^{9,10} Loss of pharyngeal reflexes and development of respiratory distress are ominous warning signs requiring immediate respiratory support. Respiratory failure is the most common cause of death.¹ An asymptomatic child should be admitted to a hospital for observation for a minimum of 12 hours if the species of scorpion was not identified.²

Pain Relief—Most patients cannot tolerate an ice pack because of severe hyperesthesia. Infiltration of the local sting site with an anesthetic generally is safe and can provide some local pain relief. Intravenous fentanyl has been used in closely monitored patients because the drug is not associated with histamine release. Medications that cause release of histamine, such as morphine, can exacerbate or confuse the clinical picture.

Antivenin—Scorpion antivenin contains purified IgG fragments; allergic reactions are now rare. The sooner antivenin is administered, the greater the benefit. When administered early, it can prevent many of the most serious complications.⁷ In a randomized, double-blind study of critically ill children with clinically significant signs of scorpion envenomation, intravenous administration of scorpion-specific fragment antigen-binding 2 (F[(ab')₂]) antivenin resulted in resolution of clinical symptoms within 4 hours.¹¹

When managing grade III or IV scorpion envenomation, all patients should be admitted to a medical facility equipped to provide intensive supportive care; consider consultation with a regional poison control center. The World Health Organization maintains an international poison control center (at <https://www.who.int/ipcs/poisons/centre/en/>) with regional telephone numbers; alternatively, in the United States, call the nationwide telephone number of the Poison Control Center (800-222-1222).

The World Health Organization has identified declining production of antivenin as a crisis.¹²

Resolution—Symptoms of envenomation typically resolve 9 to 30 hours after a sting in a patient with grade III or IV envenomation not treated with antivenin.⁴ However, pain and paresthesia occasionally last as long as 2 weeks. In rare cases, more long-term sequelae of burning paresthesia persist for months.⁴

Conclusion

It is important for dermatologists to be aware of the potential for life-threatening envenomation by certain scorpion species native to southern Africa. In the United States, stings of these species most often are seen in patients with a pet collection, but late sequelae also can be seen in travelers returning from an endemic

region. The site of a sting often appears unimpressive initially, but severe hyperesthesia is common. Patients with cardiac, neurologic, or respiratory symptoms require intensive supportive care. Proper care can be lifesaving.

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