

SPIDER BITE ENVENOMATION IN AL BAHA REGION, SAUDI ARABIA

Ionel J. Bucur, MD; Obasi E. Obasi, FRCP

Background: The purpose of this study was to highlight the clinical features of spider bite envenomation, a subject which has not, to our knowledge, been previously published in Saudi Arabia.

Patients and Methods: Ten patients (8 males and 2 females) aged between 13 and 75 years (mean 36.8) were hospitalized at King Fahad Hospital, Al Baha, with the diagnosis of spider bites during the 9-year period from June 1988 to May 1997.

Results: One of the patients was bitten on the right hand by a brown spider, causing severe cellulitis and tissue necrosis, and requiring surgical debridement and pedicle skin flap graft. The nine other patients (90%) had bites from black spiders identified as black widow spiders. Two of the nine (22.2%) suffered only local reactions in the form of pain, erythema and swelling at the site of bite. The remaining seven (77.8%), had varying symptoms of systemic envenomation, including pulmonary edema, myocardial dysfunction with elevated creatinine kinase, electrocardiographic and echocardiographic abnormalities, progressive paresthesia, generalized body ache, etc. Therapy included analgesics, muscle relaxants, intravenous infusion of calcium gluconate and oxygen where indicated. Specific antivenin therapy was available for only four of the nine patients (44%) with black widow spider bite. Antivenin therapy still produced dramatic relief of the symptoms in the patient with pulmonary edema, even after a delay of 30 hours.

Conclusion: Spider bite envenomation should be considered in the differential diagnosis of acute surgical abdomen and myocardial infarction.

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Key Words: Spider bite envenomation, antivenin therapy.

There are more than 100,000 species of spiders the world over, but only the few which possess fangs strong enough to penetrate the human skin are dangerous to man.¹ Spiders (black and brown) are common in the Al Baha region of Saudi Arabia, but dangerous bites from them have not been well documented. The mature black widow spider (*Latrodectus mactans*) has a characteristic glossy black color and hourglass configuration on its ventral surface that distinguishes it from closely related species² which are distributed throughout temperate and tropical latitudes.³ Many of the clinical manifestations produced by black widow spiders and related species have been described by various authors,⁴⁻⁶ and they include agonizing pain, muscle cramps, board-like abdomen, priapism,⁷ nausea, vomiting, ileus, gastric dilatation,⁸ anxiety, chills, hypertension, pulmonary edema,^{9,10} respiratory failure, coma,¹¹ and on rare occasions, death¹² from cardiovascular failure.¹³ A recent extensive review¹⁴ of all spider bites

showed that several thousand cases of black widow spider bites are reported annually from all over the world. To the best of our knowledge, cases of spider bite envenomation have not been previously published from the Kingdom of Saudi Arabia. We describe here our experience in 10 patients with spider bite envenomation.

Patients and Methods

Patients who took part in the study were those hospitalized with the diagnosis of spider bite at the King Fahad Hospital at Al Baha, between June 1988 and May 1997. Their hospital records were retrospectively reviewed.

Results

Five of our ten cases are described in detail below. For information on the remaining cases, refer to Table 1.

Case 1

A 44-year-old male was hospitalized with severe infection, cellulitis and tissue necrosis of his right hypothenar and mid-palmar spaces, and dorsal and ulnar aspects of his right forearm, following a brown spider bite a week prior to presentation. Laboratory tests showed

From King Fahad Hospital at Al Baha, Al Baha, Saudi Arabia.

Address reprint requests and correspondence to Dr. Obasi: Department of Dermatology, King Khalid Hospital, P.O. Box 9515, Jeddah 21423, Saudi Arabia.

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TABLE 1. *Spider bite envenomation in Saudi Arabia.*

Age/sex	Bite site	Spider species	Clinical features	Lab findings
44/M	Rt hand	Brown spider (<i>Loxosceles</i>)	Cellulitis; tissue necrosis	<i>Staphylococcus aureus</i> was isolated from lesional swab
15/M	Rt big toe	Black widow spider (BWS)	Local pain; back pain; priapism; abdominal cramps; progressive paresthesia; dyspnea/restlessness; rigors; pulmonary edema	Leukocytosis 18,000; ECG: T-inversion in I, AVL; S-T elevation AVL, V2, V3; highly elevated CK: 2085 IU/L; chest X-ray: pulmonary edema; ECHO: myocardial dysfunction; low ejection fraction 0.264
25/M	Lt foot	BWS	Abdominal pain and rigidity; signs of acute abdomen; normal laparotomy findings; patient revealed preceding BWS bite	Leukocytosis: 20,000
75/M	Rt ear	BWS	Local pain, erythema, swelling; normal vital signs	Normal
75/M	Rt forearm	BWS	Local pain, erythema, swelling; normal vital signs	Normal
15/F	Rt wrist	BWS	Local pain, swelling; severe low back pain; rigors, sweating, vomiting; irritability; elevated BP 150/90 mm Hg	Abnormal ECG: sinus tachycardia; unifocal extrasystoles; premature ventricular contraction; inverted T: V2-V4; CK: 2549; leukocytosis 17,300
13/M	Rt foot	BWS	Abdominal pain, guarding, rigidity, irritability; facial flushing	ECG: sinus tachycardia; elevated CK: 890 IU/L; leukocytosis 13,100
38/M	Rt foot	BWS	Severe pain, rising to groin; headache; chest pain; low back pain; epigastric burning pain; rigid abdomen; BP 160/100	Leukocytosis 16,200; normal ECG and ECHO; normal chest X-ray
32/M	Lt big toe	Black spider with red line on the abdomen	Local pain, erythema, swelling; pain up the leg to groin; heaviness of leg; generalized body ache; dull aching chest pain; sweating	Elevated LDH 673 U/L
36/F	Rt wrist	BWS	Local redness, swelling; severe pain going up the arm to rt mammary area; paresthesia, cramps in the back and legs; anxiety; headache	Leukocytosis 13,800; normal ECG

leukocytosis of 35,100 and sedimentation rate of 46 mm/hr Westergren. After debridement and appropriate antibiotic therapy, a left subcostal pedicle skin flap was grafted to the right hand with satisfactory results.

Case 2

A 15-year-old male was admitted to King Fahad Hospital 20 hours after his right toe was bitten by a spider he identified as a black widow. He was restless, with cold, clammy skin and a pulse rate of 100 beats/min. There was a moderate degree of priapism and board-like rigidity of the abdomen, which was diffusely tender. He also had signs of pulmonary edema and gallop rhythm. He received IV furosemide, calcium gluconate, hydrocortisone, chlorpromazine and 40% oxygen by Venturi mask, without any improvement. Ten hours after admission and about 30 hours after the bite, 2.5 mL (6000 IU) of spider antivenin (Antivenin, *Latrodectus mactans* MSD) in 50 mL normal saline was infused intravenously over a 15-minute period, which resulted in a dramatic improvement in the patient's condition. Chest x-ray and cardiac enzymes were normal the next day. Echocardiogram was normal with ejection fraction (EF) of 0.652 at follow-up a month later.

Case 3

A 25-year-old male presented to the ER with severe cramping abdominal pain and signs of acute abdomen with leukocytosis of 20,000. He had laparotomy with normal findings. He later revealed that he had been bitten in his car by a black spider prior to onset of his symptoms.

Case 8

A 38-year-old male brought a live black spider (Figure 2) that had bitten his left toe three hours previously. The pain had radiated to the groin, abdomen, lower back, epigastrium and chest, associated with transient hypertension and leukocytosis. Intravenous calcium gluconate was given without much benefit, and antivenin 2.5 mL was given, resulting in a dramatic relief of his symptoms.

Case 9

A 32-year-old male presented with pain, mild swelling and redness of his left toe 30 minutes after a bite by a black spider with a short longitudinal red line on the ventral surface of its abdomen (Figure 3), which he brought alive to the hospital. He was given local xylocaine infiltration and intramuscular injection of antihistamine and sent home. Two hours later, he came back with severe pain and heaviness of the left leg, abdominal and chest pain. Antivenin was not available and IV diazepam, pethidine, calcium gluconate and haloperidol were given repeatedly without relief of his symptoms, which lasted for 11 hours.

Discussion

Ten cases of spider bite documented in a nine-year study period is a very small number, compared to reports that number in thousands from other parts of the world.¹⁴ The single case of brown spider bite causing severe

cellulitis and tissue necrosis was most probably a bite by a spider of the *Loxosceles* species, which is known to cause necrotic araneism in other parts of the world.¹⁵⁻²⁰ Collagenase is said to be a major factor in the necrosis induced by bites of *Loxosceles* spiders.²¹ It has also been reported³ that *Loxosceles* venom contains at least eight enzymes, consisting of various lysins facilitating venom spread, sphingomyelinase-D, causing cell membrane injury, lysis, thrombosis of small arterioles,¹⁶ local ischemia and chemotaxis culminating in pain, itching, vesiculation, violaceous necrosis, erythema and ulceration.

Of the other nine patients who were bitten by black spiders of the *Latrodectus* species, two (22.2%) suffered only local pain, swelling and erythema. The other seven (77.8%) had varying combinations and degrees of severity of systemic envenomation (latrodectism): paresthesia in 44%; severe pain, waves of cramps progressively extending from bite site, back and abdominal pain/rigidity each occurred in 33% of cases; transient rise in blood pressure 30%; headache, chest pain, rigors, sweating and irritability were each recorded in 22% of cases; facial flushing, dyspepsia and vomiting each occurred in 11%. Abnormal laboratory findings included leukocytosis (70%), abnormal ECG (30%), and abnormal echocardiogram (20%).

The black widow spider (*Latrodectus mactans*) introduces highly neurotoxic venom through its strong fangs. The venom targets mainly the presynaptic motor end plate, causing excessive release of noradrenaline (norepinephrine) and acetylcholine into synapses, resulting in severe muscle cramps, followed by fatigue of motor end plates and muscle,³ rigors, sweating, vomiting, priapism, abdominal pain and rigidity, raised blood pressure and tachycardia. In a review of 45 cases of spider bite in South Africa (in which 30 were by black widow and 15 by brown widow spiders), Muller²² concluded that black widow spider (*Latrodectus mactans*) bites cause a more severe form of envenomation than brown widow (*Loxosceles*) bites, resulting in generalized muscle pain, muscle cramps, abdominal muscle rigidity, profuse sweating, raised blood pressure and tachycardia. It has been said²⁴ that the diagnosis of bites by these spiders is rarely based on absolute identification of the spiders, but more often on the history, clinical findings and course of the bite. Familiarity with the clinical manifestations of latrodectism or loxoscelism is the key to diagnosis.²⁵ In a large epidemiologic survey spanning a 10-year period (1979-1988) in Buenos Aires Province, Argentina, the biting spider was captured in only 15% of cases.²⁶ Only three (30%) of our patients captured the spiders alive. Two of these spiders were pure black in color (Figure 2). The third (Figure 3) was also black but had a short reddish broad line on the ventral surface of its abdomen. The bites of the *latrodectus* species of spiders, including the Australian red-back spider (*Latrodectus mactans hasselti*), produce identical systemic clinical features.²⁷ These clinical

features have also been reported from other parts of the world,³⁻¹² and have been proposed as the diagnostic criteria^{23,27} for systemic envenomation caused by the black widow spider.

The differences in the severity of clinical manifestations in our nine patients may be related to a difference in volume or potency of venoms introduced at each bite.²⁸ Some of the above clinical features of latrodectism have also been described in scorpion sting envenomation.^{29,30} Cardiovascular complications, which are major causes of morbidity and mortality in scorpion sting envenomation,^{29,33} are less commonly reported in spider bite envenomation.^{12,13,16} The reasons for the relative infrequency of cardiovascular complications in spider bite compared to scorpion sting envenomation are unclear, but may be related to a difference in the potency of their venoms.²⁸ In this region of Saudi Arabia, black widow spider envenomation (latrodectism) needs to be differentiated from more common conditions, such as myocardial infarction, scorpion sting, acute abdominal emergencies and labor pains^{34,35} in pregnancy. Case 3 underscores the need for a thorough history, and perhaps direct questioning about spider bite when a patient presents with signs and symptoms of acute abdomen, if unnecessary laparotomy, as occurred in this case, is to be avoided. If the information about spider bite had been obtained before surgery, the patient would have received antivenin rather than a laparotomy.

The optimal therapy for spider bite envenomation includes appropriate local first-aid to prevent dermonecrosis. For latrodectism, 10 mL of intravenous 10% calcium gluconate is given slowly over 10-20 minutes, and 10% methocarbamol for muscle spasm. These could be repeated and titrated as symptoms are relieved. Specific antivenin from MSD, 1 vial (2.5 mL) diluted in 50 mL normal saline is given IV over 15 minutes. It has been suggested³⁶ that antivenin should be given only in life-threatening situations, because of possible acute and delayed reactions against the component horse serum. Antivenin was available for only four of seven of our patients manifesting features of systemic envenomation, and it produced dramatic resolution of symptoms and signs in all of them. Antivenin therapy still achieved dramatic results when given 30 hours after the bite in Case 2. It has also been reported³⁷ that a four-year-old girl admitted 30 hours after a black widow spider bite with severe restlessness, profuse perspiration, severe abdominal pain, fever, hypertension, hematuria and ECG changes, recovered after a week with intravenous fluids only.

The apparent rarity of reported cases may be due to lack of awareness of this condition compared to scorpion stings, which are very well known in this region. Clinicians should be aware of the clinical features of spider bite envenomation in order to report more cases. Three other patients with black widow spider bite have been

hospitalized in this hospital since this manuscript was submitted.

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