

# Brown widow spider bite (*Loxosceles* sp., Araneae, Sicariidae): A case report from Kashan, Iran

Rouhullah Dehghani, PhD <sup>1</sup>  
 Rezvan Talaei, MD <sup>2</sup>  
 Javad Rafeenejad, PhD <sup>3</sup>  
 Roya Seydi Rezvani, MSc <sup>4</sup>  
 Fatemeh Karimi, MSc <sup>3</sup>

1. *Social Determinants of Health Research Center and Department of Environmental Health, Kashan University of Medical Sciences, Kashan, Iran*
2. *Department of Dermatology, Autoimmune Diseases Research Center, Kashan University of Medical Sciences, Kashan, Iran*
3. *Department of Medical Entomology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*
4. *Educational Development Center, Kashan University of Medical Sciences, Kashan, Iran*

*Corresponding Author:*  
 Rezvan Talaei, MD  
 Department of Dermatology, Kashan University of Medical Sciences, Kashan, Iran  
 Email: r\_talaei2007@yahoo.com

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A 48-year-old woman who worked as a cleaner in a Kashan University of Medical Sciences dormitory received a spider bite while collecting garbage on a summer afternoon. She felt immediate irritation on her arm. She noticed a spider, which she removed and killed. The irritation, itching, and redness on her arm continued. Her hand became edematous and painful after four days and she suffered from insomnia. Her situation became worse to the extent that she was not able to move her fingers.

The patient was hospitalized at Shahid Beheshti Hospital for four days due to the seriousness of her condition. During hospitalization, she received treatments that consisted of normal saline, corticosteroids, antibiotics, antihistamines, and analgesics after performance of any relevant tests. A tetanus vaccine and tetabulin were also prescribed. She had complaints of ongoing pain, swelling, itching, and redness for four days after which the patient was discharged with a prescription. The spider parts were sent to the laboratory for species analysis. The laboratory results diagnosed this spider as a member of the *Loxosceles* species. In most cases the cause of the bite disappears and is rarely detected. Here, although damaged, the laboratory could identify the spider.

**Keywords:** spider bite, loxoscelism, brown widow spider

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## INTRODUCTION

Spiders are prey on insects. Although some may seem annoying, they appear to effectively control the insect population and provide a balance to the ecosystem. Nearly 40000 species of spiders have been described worldwide. Approximately 200 species are dangerous to humans <sup>1,2</sup>. Many people mistakenly believe that spiders as insects.

However, insects have three pairs of legs and spiders have four pairs. One major difference is that insects have compound eyes, but spider's eyes are unique lenses. Unlike insects, spiders do not have antennae <sup>3,4</sup>. Most are harmless to humans due to the safety of most spider toxins, the small amount of toxin injected, small size of the chelicerae, and their type of lifestyle and behavior <sup>5</sup>. A spider's toxin is divided into two main groups.

Black widow spiders contain neurotoxin agents that can affect the nervous system of insects and mammals. The toxin of brown widow spiders has necrotic characteristics that cause ulcerative lesions on the skin. This toxin induces tissue damage and cell death. These toxin can also cause nausea, vomiting, chills, fever, muscle pain, a purpuric rash, hemolytic anemia, acute renal failure, shock, coma, and death<sup>6-8</sup>.

The *Latrodectus* species of widow spiders from the Theridiidae family exist in Iran. Many are toxic for humans. For this reason they have a high importance in medicine. The spiders have a global distribution and can be found most anywhere in the Western hemisphere. Some can maintain their vitality even in urban areas, and when placed in contact and proximity with humans. However, it seems that this spider prefers to reside in desert conditions<sup>9</sup>. The *Latrodectus* species can be found in most parts of the world, other than cold areas of Europe and Asia. Nearly all species of this genus are extremely important in terms of human and veterinary medicine. They are found throughout the world, such as the United States, Australia, South America, South Africa, Central Asia, and Mediterranean and Middle East countries, including Iran. Thus far, 30 species of the genus *Latrodectus* have been identified worldwide<sup>10</sup>. From the 30 known species<sup>11</sup>, only 5 have been reported in Iran<sup>5</sup> - *Latrodectus dahlia* (*L. dahlia*), *L. geometricus*, *L. pallidus*, *L. tredecimguttatus*, and *L. hasseltii*. Black widow spider bites can cause several symptoms and clinical signs called latrodectism<sup>12</sup>. Latrodectism is produced by  $\alpha$  latrotoxin which becomes clear by the rapid release of acetylcholine from neuromuscular junction. It creates systemic clinical side effects in the injured person. In severe cases, these side effects can impact the cardiovascular, respiratory, and nervous systems, including the peripheral nerves in addition to the autonomic nervous system, skeletal and smooth muscles, gastrointestinal tract and urinary tract. Additionally, it produces cutaneous side effects<sup>10,13,14</sup>.

The brown spider family and their species, which includes the *Loxosceles* genus is dangerous to humans<sup>4</sup>. The *Loxosceles* genus of brown spiders from the Sicariidae family are known as the fiddler spiders (recluse, violin or fiddle-back) and are considered dangerous due to poisoning by necrotic factors. From the 117 known species of this genus

worldwide, only the *L. refastens* species have been identified in Iran - initially in Tehran Province, followed by Hormozgan and Fars provinces<sup>15-17</sup>. Brown spiders are shy and isolated in nature. They bite when harassed. There is an anti-venom for the brown spider from the *Loxosceles* genus.

The severity of a reaction caused by a spider bite is related to the amount of injected venom at the site of the bite, the age of the victim, and injection of the contents of the spider's stomach during the sting. Treatment of *Loxosceles* spider bite involves corticosteroids, antibiotics, protection, hyperbaric oxygen therapy, and scar reconstruction. However, treatment efficacy differs amongst individuals<sup>18</sup>.

## CASE REPORT

A 48-year-old woman from Kashan, Iran received a spider bite. The patient was admitted to Shahid Beheshti Hospital in Kashan four days after the spider bite. She complained of itching and stinging at the wound. The bite area was in the right upper extremity in the medial elbow and had dimensions of 3x3 mm and a black necrotic center. Redness and swelling developed around and above the elbow up to the axilla region, which was warmer than the other area (Figure 1). The patient also complained of numbness in the first, second, and third fingers of her right hand. There was erythema on her upper chest, abdomen and back after the bite and she suffered from shortness of breath. According to the patient's medical history, she felt a severe burning sensation in her arm while collecting garbage at a girls' dormitory at



**Figure 1.** Three days after the patient's spider bite.

Kashan University of Medical Sciences. After the bite, she removed the spider from her arm, then crushed and killed it. Immediately, the injured arm became red and had black bleeding in the area of the bite with a diameter of 5 cm. That night, patient went to the clinic with severe burning and itching, where she received dexamethasone. She was hospitalized at Beheshti Hospital for four days due to the seriousness of her condition. Table 1 shows the laboratory analyses four days after the insect bite. During hospitalization, she received normal saline, corticosteroids, antibiotics, antihistamines, and analgesics. A tetanus vaccine and tetabulin were also prescribed. The patient was discharged after three days. After three months, the bite marks have remained on the patient's arm (Figure 2). Currently, she is in complete remission.

**Table 1.** Results of laboratory tests in the patient.

<b>Hematology</b>	
White blood cell count (WBC)/ml	10.3×10 <sup>6</sup>
Red blood cell count (RBC)/ml	4.53×10 <sup>6</sup>
Hemoglobin (g/dl)	13.4
Hematocrit (%)	41.2
Mean corpuscular volume (μl <sup>3</sup> )	90.95
Mean concentration of hemoglobin (pictogram/dl)	29.58
Mean concentration of hemoglobin per cell (g/dl)	32.52
Platelet count	241×10 <sup>3</sup>
Red distribution width (RDW)	13.4
Erythrocyte sedimentation rate 1 h (mm/h)	15
Prothrombin time(s)	12.9
International normalized ratio (INR)	1.1
Partial thromboplastin time (PTT; s)	27
<b>Biochemistry and electrolytes</b>	
Blood urea nitrogen (mg/d)	20
Creatinine (mg/dl)	1.0
Aspartate aminotransferase (AST; IU)	26
Alanine aminotransferase (IU)	26
Alkaline phosphatase (IU)	143
Calcium (mg/l)	8.8
Magnesium (mg/l)	2.2
Sodium (mg/l)	143
Potassium (mg/l)	4.2
<b>Urinalysis</b>	
Crystal	Cysteine
Color	Yellow
Appearance	Clear
pH	5
Specific gravity (g/)	1020
Blood	Trace
RBC	3-4
WBC	1-2
Other tests	Normal



**Figure 2.** Three months after the spider bite.

## DISCUSSION

Venomous spider bites are medically important in Iran<sup>18</sup>. We have reported the rare case of a brown widow spider that caused unpleasant and painful local and systemic manifestations for the patient. The patient was admitted to the hospital four days after spider bite. She complained of itching and burning at the bite area. On examination, the wound was black due to central necrosis. The final diagnosis was loxoscelism based on clinical observations, physical examination, and laboratory studies.

In most cases, the cause of the bite disappears and is rarely detected. Diagnosis is more likely probable and only based on clinical signs and symptoms. In our study, although the spider was crushed, it was identified by more meticulously evaluation<sup>2,19</sup>.

Some of the harmful effects of local and systemic brown spider venom are due to proteolytic factors that decrease fibrinogen, fibronectin, heparin sulfate, and proteoglycan. As a result, this spider's venom causes skin lesions that appear with itching and swelling a few hours after the bite, after which it may cause local bleeding, disseminated intravascular coagulation, and renal failure<sup>20</sup>. Activity of sphingomyelinase D in the venom of the *Loxosceles* spider is the main cause for bleeding and necrotic lesions<sup>7,8</sup>. According to a study by Diaz, the most important findings in brown widow spider bites are skin lesions<sup>1</sup>. In this case report, cutaneous lesions have been detected from the third and fourth days; these clinical symptoms were characteristic of Loxoscelism. Varying degrees

of clinical symptoms are caused by spider bites based on the amount of injected venom, the age of the patient and the status of his/her immune status. Bites are usually seen at one point and can cause systemic symptoms, skin symptoms or both.

Due to the broad dispersion of medically important spiders, periodical and regional outbreaks in Iran, the importance of accurate diagnosis becomes clear for suitable preventive or treatment measures. The incidence of bites caused by poisonous insects, such as widow spiders, occurs more in places with natural open spaces such as countryside and rural areas. Spider bites that occur in the dormitory of Kashan University of Medical Sciences can cause anxiety and disruption for students. So, preventive measures such as spraying, and the use of a net are necessary.

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