

Loxoscelism: a case report from Bandar Abbas in south of Iran

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(Received 24 Jul, 2013

Accepted 6 Nov, 2013)

Case Report

Abstract

Introduction: Loxoscelism is a medical condition resulting from the envenomation by recluse spiders (*Loxosceles* spp.), which could lead to necrotic tissue symptoms. The only species of this genus recorded from Iran, *Loxosceles rufescens*, or the Mediterranean recluse spider, has a cosmopolitan distribution and have already been recorded from numerous parts of Iran, including Bandar Abbas. This study aims to report a case of loxoscelism in Bandar Abbas (southern Iran) for the first time.

Patient: This report is related to a 46-year-old female patient who referred to infectious ward of Shahid Mohammadi Hospital, with acute necrotic clinical symptom on right flank of her trunk due to the bite of a spider.

Conclusion: As *Loxosceles rufescens* has already been recorded from Hormozgan Province, cases of loxoscelism are likely in this region. Diagnosis and treatment of most of the cases is very difficult, because the spider may not be identified correctly and the clinical symptoms are similar to other diseases; this will result in false differential diagnosis of the disease and consequently, delay in appropriate treatment.

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Key words: Spider Bite - Recluse Spider - Bandar Abbas - Iran

Citation: Shahi M, Shahi A, Khademi Z, Zamani A.R, Nakhaii A.R, Rafinejad J. Loxoscelism: a case report from Bandar Abbas in south of Iran. Hormozgan Medical Journal 2014;18(5):408-413.

Introduction:

Up to now, about 45180 species of spiders have been identified in the world. The venom of about 200 species is dangerous for humans. Notable medically important spiders belong to four genera: *Latrodectus*, *Atrax*, *Phoneutria* and *Loxosceles* (1-4). Through bites, spiders can cause inflammatory reactions via insertion of their venom. However, spiders usually use venom for their prey paralysis.

Because of their reclusive behavior, spiders of the genus *Loxosceles* are commonly referred to as "recluse spiders". The length of these spiders

usually ranges from 1 to 5 cm (including the legs). They are light brown to dark brown in color, and usually, there is a violin-shaped mark on the cephalothorax, based on which they are also called "violin spiders" (6-8) (Figure 1).

Recluse spiders are distributed in every continent except Antarctica, and their temperature preference ranges from 8° to 43° C (9).

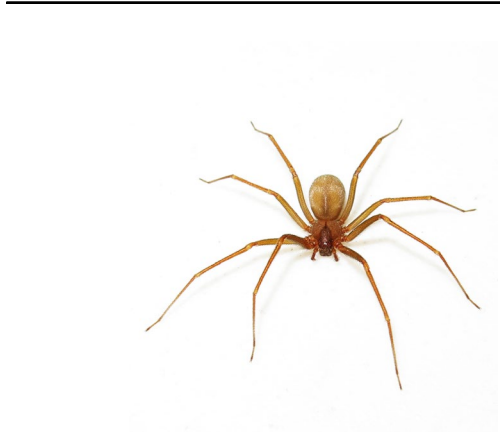


Figure 1. *Loxosceles rufescens* spider, with a violin-shaped mark on the cephalothorax.
Original photo taken by AR. Zamani

The web of recluse spiders is often an irregular silky mass used as day time hideout. They generally live in wood piles, rotting barks, amidst plants, gardens, storehouse, farms and shrubbery. However, they seem to hide in cartons and woodworking stuffs in houses because they are similar to their natural habitats. In residential buildings, recluse spiders are so much interested in hiding amidst clothes, in shoes, beds, wooden boxes, cartons, under closets and cabinets during the day, and leaving them at night for hunting (2, 10).

Spiders inject their venom, which is produced in venom glands, via fangs into their prey. Being bitten by recluse spiders is generally an accidental cause and happens mostly when the victim is putting on either clothes or shoes, drying body with a towel and sleeping in bed.

Venom of recluse spiders contains molecules and enzymes including alkaline phosphatase, 5-ribonucleotide phosphohydrolase, phospholipase, sulfate nucleoside, lipase, protease, metalloprotease, serine protease, esterase, hyaluronidase, and active sphingomyelinase D, which by itself results in hemolysis, systemic and cutaneous reaction (5,6,11).

Loxoscelism is a term denoting the likely complications of recluse spider bite (6,8). There are two types of loxoscelism: topical and systemic. Topical complications include severe dermonecrotic lesions and cutaneous symptoms, while the systemic complications are specified by several symptoms including nausea, vomit, chills, fever, restlessness, muscular pain, general rashes, purple

cutaneous spots, hemolytic anemia, hematuria, renal failure, shock, coma and death (5,12,13). Elderly and children are more susceptible to systemic loxoscelism.

The bite of recluse spider is initially impalpable and painless, but over time the width of the bite site may extend to 25 cm in diameter. Itching and pain start in 2 to 8 hours after the bite. Pain and topical symptoms develops after 12 to 36 hours, while tissue necrosis occurs in a few days. Severe symptoms including hemolysis, reduction of platelets and disseminated intravascular coagulation occur in rare cases (14). Recluse spider envenomation is one of the most common health problems in such countries as Northern America, Mexico and Brazil, and one case of loxoscelism caused by *Loxosceles rufescens* has been reported from Turkey, a neighbor of Iran (1).

Studies show that the only species of recluse spiders occurring in Iran is the Mediterranean recluse spider, *Loxosceles rufescens*, which has been recorded from Fars, Hormozgan, Razavi Khorasan and Tehran Provinces so far (15).

The aim of this study is to present a case of loxoscelism caused by *Loxosceles rufescens* in Bandar Abbas to inform healthcare providers, especially those in Hormozgan Province for better diagnosis and treatment of future cases.

The case report:

The patient was a 46-year-old female, with a severe tissue necrosis due to a spider bite. She was bitten on the right flank of her trunk when she was at her detached house located in Bandar Abbas in May 2010. She commented that she initially felt a very slight painless annoyance. She was treated by a specialist for infectious diseases, and her consent was obtained for publication of this report. Demonstration process of the symptoms in this patient was as follows:

First day: Mild itching and change of color as black spots were observed at the site of bite after about 8 hours (Fig. 2). One hour later, pain started at the site of the bite, increased over time and reached unbearable levels. Then, she was referred to emergency ward at Shahid Mohammadi Hospital, Bandar Abbas. After physical examinations, the physician at the ward ordered

coagulation tests and urine analysis. The results were normal. At this stage, antibiotics, hydrocortisone and palliatives were prescribed.

Second day: Despite taking the medication, there still existed severe pain and expansion of the injury after 24 hours. It resulted in onset of cellulitis signs which was about 5 cm in diameter (Figure 2).

Third day: Dermatologist recommended the continuation of antibiotics, washing the ulcer with dalibour water and taking stronger palliatives.

Fourth day: The symptoms of cellulitis worsened and expanded.

Fifth day: The patient was referred to the specialist for infectious diseases and hospitalized. Broad spectrum antibiotics were administered intravenously.

Sixth day: On the 6th day, or in the other words, on the 2nd day of hospitalization, there was spontaneously evacuated discharge at the site of the injury. This resulted in a cavity with 4 cm diameter and about 2 cm depth (Figure 2-5). Regular dressing and wound care were continued until the 7th day.

Seventh day: By consent, the patient was discharged from hospital. At home, intravenous antibiotics, wound wash and dressing were followed until the 11th day.

Twelfth day: After the completion of intravenous antibiotic, the patient was referred to the specialist of infectious diseases. Then she was prescribed oral antibiotic, and introduced to a surgery specialist for daily debridement of the wound for 3 days (Figure 6). Afterwards, regular dressings with TIELLE and NU-Gel were performed by an experienced nurse at home.

During the treatment, the patient took vitamin supplements, nutrients and palliative as per the order of the physician. The wound gradually healed until the 25th day while the scar remained.

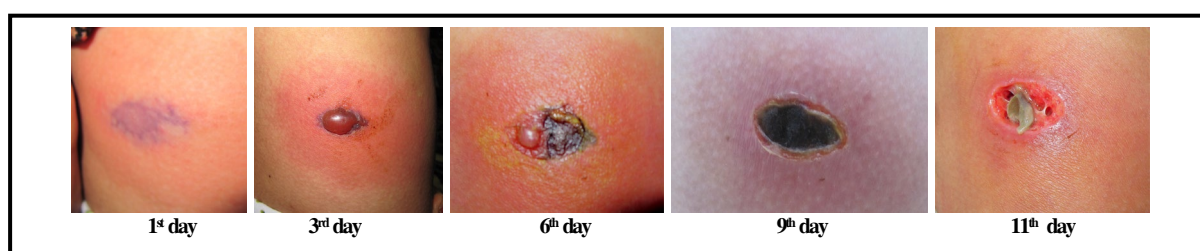


Figure 2-6: From left to right, the stages of bite by recluse spider. Original photos from the 1st day to the 11th day, taken by M. Shahi

Conclusion:

This report shows that loxoscelism is very likely in Bandar Abbas, and also other regions in Iran. However, final diagnosis of this condition is assumed to be very difficult for physicians because patients do not usually notice the biting agent due to the lack of pain at the time of the bite and the small size of the spider. Moreover, there are similarities between the symptoms of loxoscelism and other diseases; this results in a delay in diagnosis errors and treatment of the disease. Loxoscelism diagnosis in most cases is based on epidemiologic findings, history, patient's signs and symptoms mainly due to not observing the spider (6). Moreover, many cases of spider bites may be misdiagnosed by the similar

complications of scorpionism (e.g. genus *Hemiscorpius*).

The captured spider

The spider was captured at the time of biting the patient, and was identified as *Loxosceles rufescens*, after studying the morphologic features by the use of valid diagnostic resources and a stereomicroscope at medical entomology laboratory affiliated to Hormozgan University of Medical Sciences, and at the animal biosystematics laboratory of University of Tehran. These spiders are six-eyed, and their females lack the sclerotized epigyne, and males have simple palpal organs.



Figure 7: The number and the position of eyes in *Loxosceles rufescens*. Original photo taken by M. Shahi.

In urban areas of Bandar Abbas, this spider shelters in dark and humid places like warehouses, additional equipment stored in yards, balconies, storehouses, amidst plants and bushes in gardens and parks. Contact of human and recluse spiders generally happens accidentally and is usually either at the time of activity at the afore-mentioned places or sleeping in bed and putting on clothes.

Preliminary investigations show that similar cases have been referred to public and private healthcare providing centers in Bandar Abbas. Previously, two doubtful reports of loxoscelism were reported from southern and northeastern Iran (14,16).

As mentioned before, the venom of recluse spider is a complicated combination of various chemical substances. The venom reduces the extracellular components influencing diffusion (9). One of the most important symptoms of bite by recluse spiders is a severe cutaneous sensitivity followed by severe pain and blister at the site. Initially the skin at the bite site becomes red and after one day it turns to purple, which in this stage is called "livedoid plaque" (7). It is estimated that 89 to 98 percent of loxoscelism cases develop topical complications within 12 to 36 hours after bite. The first symptoms are blister, non-specific erythema and swelling at the site of bite. The symptoms rapidly continue with the expansion of bleeding, decreased local tissue blood supply, increased local pain, and sometimes fever (17). It is

noteworthy that the above symptoms were observed in the case presented in this study.

The above-mentioned symptoms can guide physicians for on time diagnosis of the disease and starting proper treatment while there is lack of specific diagnostic tests for loxoscelism in the country. Studies show that loxoscelism can be diagnosed para-clinically by ELISA method in cases in which the biting agent is not identified (18).

The severity of symptoms resulting from recluse spiders bite depends on the quantity of the injected venom, site of the bite and age and health status of the patients. The initial treatment is supportive and includes washing the site of bite with water and soap, using icepack for reducing itching, redness, edema and pain. The patient should avoid strenuous activities, and debridement and administration of topical steroids should be avoided, as it may result in further expansion of the necrotic lesion (11,19). The symptoms of loxoscelism are similar to the symptoms of some other diseases including Methicillin-resistant staphylococcus aureus (MRSA) (20).

Steroids, dapsone and antibiotics have been used for the treatment of the patients bitten by recluse spiders (5), which is prohibited to prescribe dapsone individuals with deficiency of G6PD to avoid extensive hemolysis (13). Tetracyclines inhibit the dermonecrotic enzyme of venom through divalent cation chelation (21). Although prescription of the above drugs does not affect remarkably on definite improvement of the patients, they are helpful for decreasing the side-effects. The appropriate drug for treatment of spider bite is anti-venom serum.

Due to high cases of loxoscelism in Brazil, anti-S Mase D serum is recommended. It is effective on three most common species of *Loxosceles* in this country (22). In regions like Australia, America and south of Africa, anti-venoms (F (ab) and Ig G) are produced by immunization of horses with discharges of venomous glands of the spider (14). The effectiveness of the anti-venom is 12 hours after bite, while most of the victims are not referred to physicians during this effective duration.

In public and private healthcare facilities in Hormozgan Province, lack of scientific resources regarding fauna, ecology and distribution of recluse spiders has led to treatments based on presumptive

diagnosis mainly due to anonymity of the biting agent. This has resulted in proper treatment delay and a wide range of complications for the patients.

Loxosceles rufescens is one of the medically important spiders in Bandar Abbas. The symptoms resulted from the bite of this spider is quite acute and can be dangerous for patients. Healthcare providers encountering likely cases of spider bite should judge for diagnosis based on geographical distribution of these spiders in the country, the patient's history, clinical symptoms, and epidemiologic findings to reduce the duration of hospitalization and to prevent irreparable complications of loxoscelism in the patients.

To identify the geographic distribution of medically important spiders in the country or in the province precisely, the physicians are suggested to report the cases to health organizations and refer the patient with the biting spider to medical arachnologists.

Acknowledgement:

Authors would like to thank Ms. Kolsoom Rashid, medical entomology laboratory expert at entomology laboratory of Bandar Abbas Health School affiliated to Hormozgan University of Medical Sciences, for her support and assistance for taking photographs of the spider.

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