CASE REPORT

Reversible myocarditis after spider bite

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SUMMARY

Black widow spiders (*Latrodectus tredecimguttatus*) are poisonous spiders endemic in Turkey. *Latrodectus* bites may cause myocarditis with increased cardiac enzymes. We treated two men (aged 20 and 33 years) who had myocarditis after black spider bites with leucocytosis and elevated levels of troponin I, creatine kinase and creatine kinase-MB fraction. Both patients had normal results on an ECG, and one patient had abnormal echocardiography with minimal left ventricular wall movement disorder. Both patients were hospitalised in the intensive care unit and treated with intravenous fluids, analgesics, spasmolytic drugs, tetanus prophylaxis and cardiac monitoring. The levels of troponin I, creatine kinase and creatine kinase-MB fraction improved, and the patients were discharged home on the third and fifth hospital day without complications. Myocarditis after a *Latrodectus* bite is rare, but may be associated with serious complications. Therefore, in regions endemic with *Latrodectus* spiders, prudent treatment of spider bites may include cardiac evaluation and monitoring.

BACKGROUND

Spiders live in dry, dark environments, and spider bites frequently are encountered in spring and summer months.¹ *Latrodectus tredecimguttatus*, also known as black widow spiders, have a red, hourglass-shaped abdominal mark, are 12–15 mm in size and are dangerous to humans. They live in hot and dry environments, are found in Turkey and can be found indoors in cold climates.^{2–3} The younger *Latrodectus* spiders have a prominent red line in the middle of the body or crosscut lines passing through the back and abdomen.

All *Latrodectus* spiders are poisonous, and systemic symptoms and signs develop in approximately 33% patients who are bitten.² The *Latrodectus* bite may affect the nerve, muscle and organ function. The α -latrotoxin protein in the spider venom affects the nervous system and causes excessive release of acetylcholine and noradrenaline, opening calcium channels at the neuromuscular junction and postganglionic noradrenergic synapses.

With *Latrodectus* bites, the patient initially may feel slight paresthesia, and the pain may increase at the site of the bite during the first hour and spread proximally in the extremities towards the body.⁴ Most bites occur in the legs or arms and the pain spreads into the inguinal or axillary region within 5–15 min. Pain in the inguinal or axillary lymph nodes may be a sign that the toxin has spread through the lymphatic system. Common systemic symptoms include severe pain, stiffening and cramps in the abdomen, back, chest and extremities; headache, paraesthesias, cold perspiration,

hypertension, tachycardia, piloerection, nausea, vomiting, malaise, lethargy and dyspnoea; and photophobia, involuntary actions and psychomotor failure.^{5–7} The pain in larger muscle groups may spread rapidly.³ Clinical symptoms and signs, especially in children, can be mistaken for other problems such as an acute abdomen.⁸

Latrodectus bites also may cause ECG ST-T segment changes and myocarditis with elevated levels of cardiac enzymes. We treated two patients who had elevated cardiac enzymes after spider bites.

CASE PRESENTATION

Patient 1

A 20-year-old man felt pain in his left leg while working in his field and he saw a black spider on the ground. He was taken to the emergency service 2 h later with complaints of dizziness, nausea and severe headache. He had generalised body pain, abdominal cramps and profound perspiration. Physical examination showed that his temperature was 37.2°C, blood pressure 80/60 mm Hg and heart rate 110 bpm. He had anxiety and cold perspiration, and a bite mark (0.5 cm) in the surrounding hyperaemic area was noted on the lateral aspect of the left knee. Laboratory studies showed elevated white blood cell count and elevated levels of troponin I, creatine kinase and creatine kinase-MB fraction (table 1). ECG showed normal sinus rhythm and echocardiography showed minimal left ventricular wall movement disorder.

Patient 2

A 33-year-old man was bitten by a black spider between the right first and second toes while he was working in a field. He was taken to the emergency service 3 h later with complaints of pain progressing from the right foot proximally, stomach ache and severe chest pain. Physical examination showed that his temperature was 36.9°C, blood pressure 135/90 mm Hg and heart rate 84 bpm. He was conscious and cooperative. There was a bite mark (0.3 cm) with hyperaemia between the right first and second toes. At 8 h after presentation, laboratory studies showed elevated white blood cell count and elevated levels of troponin I, creatine kinase and creatine kinase-MB fraction (table 1). ECG showed normal sinus rhythm, and echocardiography was normal.

TREATMENT

Both patients were diagnosed with myocarditis caused by latrodectism, hospitalised in the intensive care unit and treated with intravenous fluids, analgesics (tramadol and metamizole), spasmolytic thiocolchicoside drugs, tetanus prophylaxis and cardiac monitoring.

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Table 1 Laboratory studies in patients who had myocarditis caused because of *Latrodectus*

Patient	Hospital day*	White cell count ($\times 10^9/l$)	Troponin I ($\mu g/l$)	Creatine kinase (U/l)	Creatine kinase-MB fraction ($\mu g/l$)
Normal range		4.0 to 10.0	0 to 0.10	30 to 200	0 to 5
Patient 1	Day 1†	20.7	14.44	1488	54.5
	Day 2		11.17	1205	46.8
	Day 3		4.88	435	19.2
	Day 5		0.64	80	3.9
Patient 2	Day 1 (initial)‡	11.3	0.13	732	4.9
	Day 1 (8 h)	12.7	1.06	723	6.8
	Day 2	18.1	6.26	794	14.2
	Day 3		0.88	140	2.5

*Day 1, day of spider bite and presentation to emergency services.

†Patient 1 on day 1: blood urea nitrogen 49 mg/dl, creatine 0.7 mg/dl, aspartate aminotransferase 100 U/l, alanine aminotransferase 33 U/l, sodium 145 mmol/l and potassium 5.1 mmol/l.

‡Patient 2 on day 1: blood urea nitrogen 36.2 mg/dl, creatine 0.8 mg/dl, aspartate aminotransferase 31 U/l, alanine aminotransferase 24 U/l, sodium 142 mmol/l and potassium 3.9 mmol/l.

OUTCOME AND FOLLOW-UP

Patient 1

The levels of troponin I, creatine kinase and creatine kinase-MB fraction improved from the first to the fifth day in hospital (table 1). The patient improved clinically, and was discharged on the fifth hospital day.

Patient 2

The levels of troponin I, creatine kinase and creatine kinase-MB fraction were increased on the second hospital day and decreased on the third hospital day (table 1). The patient improved clinically, and he was discharged on the third hospital day.

DISCUSSION

Both patients had a history of being bitten by a black spider. It can be difficult to diagnose *latrodectism* and envenomation, especially if the patient is not aware of being bitten. A detailed history from the patient or relatives and observation of the spider can help establish the diagnosis. It is important to examine the bitten area and document the clinical symptoms and physical findings.³ The local area has endemic occurrence of *L. tredecimguttatus*; although the descriptions of the spiders were consistent with *Latrodectus* spiders, none of the patients brought the spiders to the emergency service for identification.

In some patients with *Latrodectus* bites, symptoms may evolve in 48 h and clinical improvement may occur in several days to 1 week. Some patients may develop pain that persists for days or weeks.⁹ In the two present patients, clinical symptoms occurred within 3 h after the bite, and improvement occurred within 3 days after the bite.

Cardiac effects such as chest pain and ECG changes are uncommon with *Latrodectus* bites.⁶ The ECG findings after *Latrodectus* envenomation are varied, and may include ST-segment and T-wave depression, prolonged QT interval, tachycardia and atrial fibrillation.¹⁰ Reversible myocarditis with cardiogenic pulmonary oedema may occur after black widow spider envenomation and may necessitate mechanical ventilation.¹¹ The mechanism of myocardial injury is unknown and may include direct toxic effect of α -latrotoxin,

catecholamine fluctuation or hypersensitivity response.^{12 13} Pathological ECG changes were not observed in the present patients.

High troponin I levels, noted in both the patients, may be attributed to leucocytosis and myocardial involvement. Furthermore, the elevated creatine kinase and creatine kinase-MB fraction may have occurred because of myocardial injury. Compared with patient 2, patient 1 had more severe cardiac involvement, evidenced by the earlier and higher peak in the troponin I level, hypotension, tachycardia and left ventricular motion disorder on echocardiography. Both patients did not have acute coronary syndrome, and invasive cardiac treatment was not required.

Treatment of *Latrodectus* bites may include spider antivenom (5 ml in children and adults, may be repeated within 4–6 h) when systemic symptoms occur.¹⁴ We did not use spider antivenom in the present patients because it was not available in Turkey. Intravenous fluid replacement is required to maintain adequate hydration and renal perfusion. Central nervous system-blocking agents such as opioids and benzodiazepines may be detrimental because of potential respiratory depression. Muscle pain and cramps may be improved with calcium gluconate.³ Both patients received supportive treatment in the intensive care unit, including intravenous fluids, analgesics (including tramadol, because this drug does not cause respiration depression, and metamizole) and thiocolchicoside muscle relaxants. The clinical and laboratory assessments improved during the hospital stay. Tetanus prophylaxis was provided in both patients, as previously recommended, because spider bites may become infected with tetanus.³

In summary, the two present patients had myocarditis after black spider bites, and treatment with supportive care resulted in clinical improvement. When a patient presents with systemic symptoms, ECG changes and high cardiac enzymes, the differential diagnosis may include *Latrodectus* envenomation. Public awareness of this problem may improve the possibility that patients will bring the spider after a bite for proper identification. When a *Latrodectus* bite is suspected, it is important to measure cardiac enzymes and monitor the ECG because there is no specific method to identify the spider venom in blood or serum samples.

Learning points

- ▶ All *Latrodectus* spiders are poisonous, and systemic symptoms and signs develop in approximately 33% patients who are bitten.
- ▶ *Latrodectus* bites may cause myocarditis including ECG ST–T segment changes, echocardiographic changes and elevated levels of cardiac enzymes.
- ▶ In regions endemic with *Latrodectus* spiders, prudent treatment of spider bites may include cardiac evaluation and monitoring.

Competing interests None.

Patient consent Obtained.

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