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Unusual presentations of scorpion envenomation

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Scorpions are nocturnal arthropods that inject their venom through the victims' skin by stingers. By the envenomation, clinical manifestations in a wide spectrum may occur, including pain at one side and death because of severe cardiopulmonary or neurological abnormalities. Sometimes the victim cannot describe the insect or does not remember even being stung after the

event. We present two cases of scorpion envenomation with different and rare clinical situations with a short review of the literature.

Key words: envenomation; hypopotassemia; myocardial infarction; scorpion

Introduction

Scorpion sting may cause discomfort and serious health problems; ranging from pain, bleeding disorders,¹ neuropsychiatric manifestations including mental abnormalities,² cerebral edema, seizures,³ stroke,⁴ paresthesia, and paralyzes,⁵ allergic reactions, anaphylaxis,⁶ infections including infective endocarditis,⁷ toxidrome syndromes and also hypertension, myocardial ischemia, and pulmonary edema,^{2,8,9} by means of different toxins and mechanisms. Foresight of possible manifestations is usually hard because of the lack of knowledge about the toxin type of the insect in many cases. In this article, we present two cases with unusual symptoms admitted to emergency department because of scorpion envenomation.

Case 1

A 42-year-old woman admitted to emergency department of a University hospital with the complaint of pain on the left gluteal region after being stung 3 h previously by a scorpion in the toilet during defecation. She was known to be healthy except the last days, had no family history of any chronic disease or malignancy, and was diagnosed as suffering from depression and taking antidepressants for a year. She was found lying on the ground unconscious where she had vomited before and after. During the initial examination she was conscious, with Glasgow Coma Score 15, seemed

to be anxious, with a sweaty and pale skin. She was given dextrose solution and capillary glucose measurement was made to exclude hypoglycemia. Her vital signs were normal: blood pressure, 130/70 mmHg; pulse rate, 77 beats/min; respiration rate, 16/min; temperature (axillary), 36.5 °C; O₂ saturation by pulse oxymetry, 99%. Her systemic and neurologic examination showed nothing pathological except an ecchymosis, 1 × 1 cm in size, where she was complaining of a pain on the left gluteal region where stung occurred. Her electrocardiogram (ECG), showing sinus rhythm with normal PR and QT intervals, presented 1 mm ST depression on precordial and extremity derivations where 2 mm ST elevation was found on aVR (Figure 1). She was asked about any chest pain, shortness of breath, or syncope previously or after incident, but she could not remember any. Her blood was obtained for complete blood count and biochemical blood analyses, including creatine kinase (CK), CK-MB, and cardiac troponine-T (Tr-T) (Table 1). CK, CK-MB, and Tr-T were elevated with a CK/CK-MB ratio 11.5 (Table 2). She was given salicylate and tetanus prophylaxis. Her cardiac enzyme follow-up showed elevation in all the parameters first, then decreasing values of CK-MB but persistence of Tr-T elevation. Her ECG returned normal, except wide tall T waves, which remained same in her follow-ups and thought to be a normal variation because of being slim, in the second hour of admission (Figure 2). Her echocardiography was performed and there was no contraction or valvular abnormality and ejection fraction measurements were reported as normal. She was given 300 mg aspirin, transported to coronary intensive care unit on the second day, after a 12-h observation period for other

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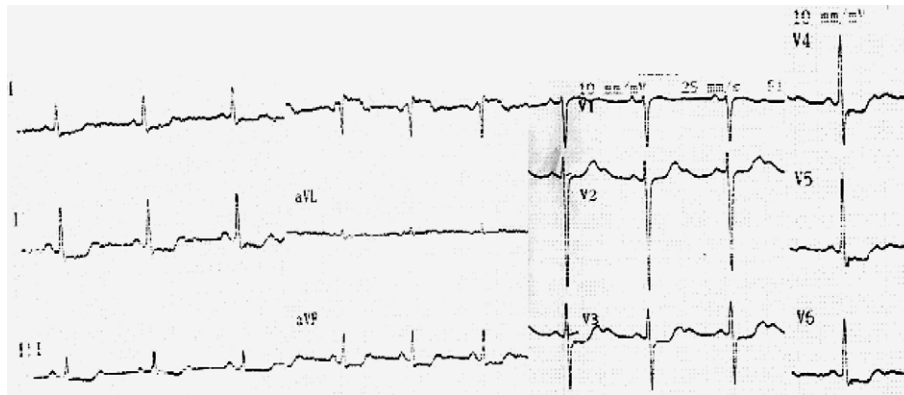


Figure 1 ECG of the patient (case 1) on admission with ST segment changes.

possible toxidromes in emergency department, where she was given low-molecular weight heparin, metoprolol, kaptopril, statine, and clopidogrel. Her coronary angiography was performed on the sixth day of hospitalization. Again, there was no abnormal vascular structure, such as plaque, thrombosis, or dissection in coronary arteries. She was followed up one more day and discharged on the 7th day of hospitalization with her previous health status.

Case 2

A 22-year-old male patient, who was first seen by a general practitioner after being stung by a scorpion

several times in left leg, gluteus, and waist while sleeping, admitted to emergency department of a University hospital. His vital signs on admission were: blood pressure, 120/80 mmHg; pulse rate, 120 beats/min; temperature, 38 °C (axillary); respiration rate, 24/min. He seemed to be fatigue and sleepy, and he was shivering. His neurological examination showed serious flaccid quadriparesis (power grade: 3/5 in proximal muscles, 3/5 in distal muscles of the upper limbs, and 2/5 in the lower extremity) and disartria, babinski signs were both negative. Cardiac and pulmonary auscultations showed nothing except elevated respiratory and pulse rates. His abdominal, genital and rectal evaluations were normal. His initial ECG showed sinus

Table 1 Laboratory values on admission and before discharge of the patients

Parameters (normal values)	Patient 1		Patient 2	
	Initial	Final	Initial	Final
WBC (4.3–10.3 μ L)	17400	6500	9200	—
Hgb (13.6–17.2 g/dL)	15.1	14.4	13.0	—
Hct (39.53–50.303%)	43.3	40.9	39.3	—
MCV (80.7–95.5 fL)	90.6	88.3	87.8	—
Plt (156–373.3 μ L)	296,000	270,000	197,000	—
Glc (70–105 mg/dL)	134	107	128	—
AST (5–40 U/L)	54	19	17	—
ALT (<41 U/L)	27	16	16	—
BUN (5–20 mg/dL)	14	10	10	13
Cr (0.8–1.2 mg/dL)	0.5	0.5	0.8	0.7
Na (135–145 mmol/L)	139	138	142	133
K (3.5–5.1 mmol/L)	4.8	4.6	3.2	3.9
CPK (<170 U/L)	301	127	219	105
CK-MB (0.97–4.94 ng/mL)	26.47	2.53	2.80	—
TrT (<0.01 ng/mL)	0.37	<0.01	0.019	—
PT (11–15 s)	16.9	—	13.7	—
INR (<2)	1.3	—	1.09	—
aPTT (22.6–35 s)	28.4	—	27.9	—
Fibrinogen (275 mg/dL)	340	—	256	—

Initial, values on admission; Final, values before discharge; WBC, white blood cell; Hgb, hemoglobin; Hct, hematocrit; MCV, mean corpuscular volume; Plt, platelet; Glc, glucose; AST, aspartate transaminase; ALT, alanine transaminase; BUN, blood urea nitrogen; Cr, creatinine; Na, sodium; K, potassium; CPK, creatine phospho kinase; CK-MB, creatine kinase isoenzyme MB; Tr-T, troponine-T; PT, protomine time; INR, international normalization ratio; aPTT, activated partial thromboplastin time; (—), not repeated.

Table 2 Cardiac enzyme follow-up of the patient 1

Parameters (normal values)	On admission	4th hour	Day 2	Day 3	Day 4	Day 5	Day 6
CK-MB (0.97–4.94 ng/mL)	26.47	28.29	17.90	14.33	8.29	3.37	2.53
Tr-T (<0.1 ng/mL)	0.37	0.53	0.39	0.34	0.23	0.23	<0.01

CK-MB, creatine kinase isoenzyme MB; Tr-T, troponine-T.

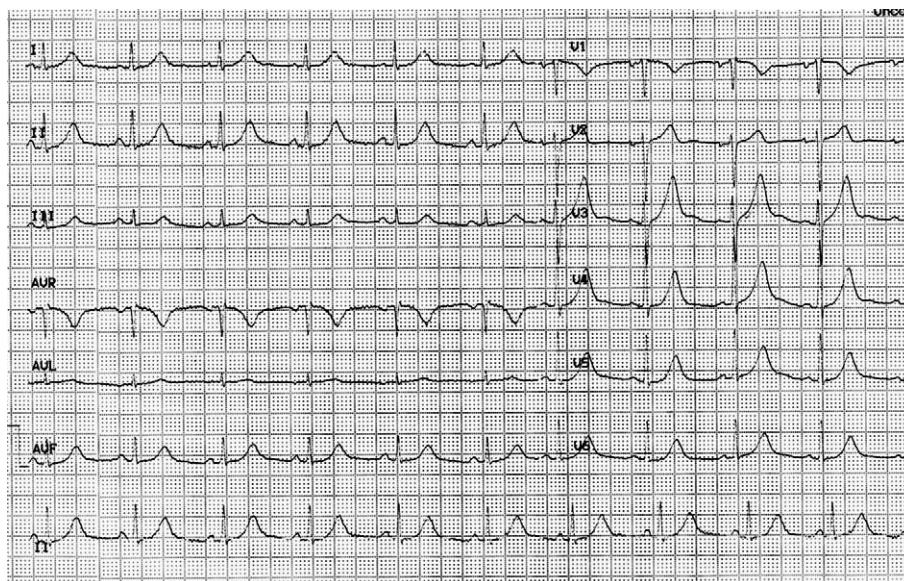


Figure 2 Control ECG of the patient (case) 1 with normal ECG findings.

tachycardia, presence of U wave and mild QTc elongation (QTc = 0.46 sn) (Figure 3). Blood samples for hematological, coagulation, blood gas, and biochemical analyses were obtained (Table 1). His blood gas results showed compensated respiratory acidosis as follows: pH, 7.427; pCO₂, 30.0; pO₂, 113.8; HCO₃, 20.0; O₂ saturation by pulse oxymetry, 98.6%. He was given one vial of scorpion antivenin infusion, tetanus prophylaxis, and 50 µg fentanyl for pain

relief. Antivenin infusion was completed in an hour, and his dysarthria was resolved but paresia did not. His initial biochemical analyses showed hypokalemia, 2.3 mmol/L. Then 30 meq KCl in normal saline was planned to infuse in an hour. Control ECG showed nothing pathological (Figure 4). His fever was treated by using cold bags. All his neurologic symptoms, tachycardia, tachypnea, and fever were resolved. He was discharged after being

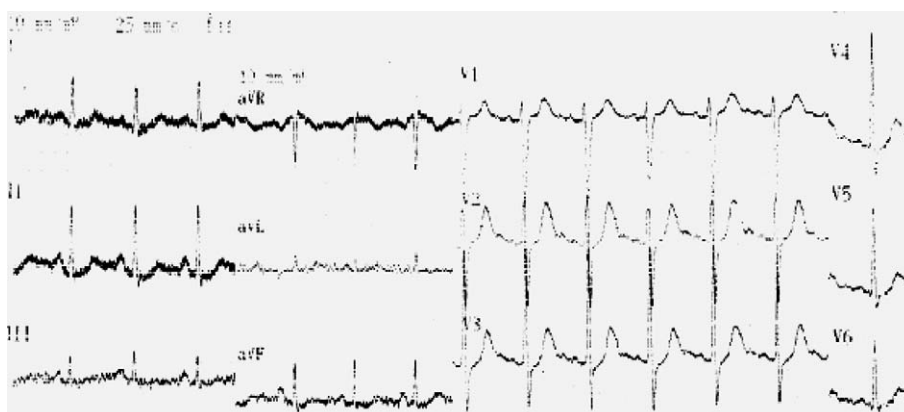


Figure 3 ECG of the patient (case) 2 showed sinus tachycardia, presence of U wave and mild QTc elongation (QTc = 0.46 sn), suggesting hypokalemia.

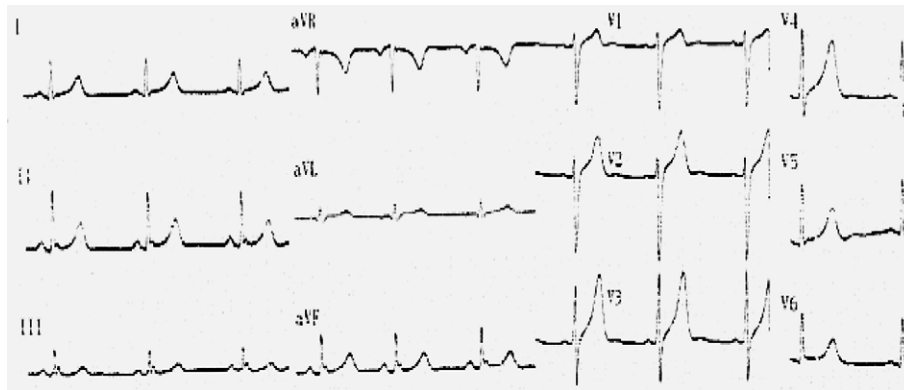


Figure 4 Control ECG of the patient (case) 2.

observed for 24 h in observation unit, no complications occurred.

Discussion

Scorpions, the most primitive and oldest members of the terrestrial arachnids, are members of the order Scorpionida.¹⁰ Scorpions inject their venom subcutaneously with a stinger that is located at the end of their multisegmented tail, after inflicting their stings on the skin of the victim.⁶ Lymphatics are the main way of transportation of the venom to reach systemic circulation.⁶ Scorpion stings are common in tropical and subtropical regions of the world.¹¹ *Androctonus crassicauda*, *Compsobuthus mattheseni*, *Leiurus quinquestriatus*, *Mesobuthus caucasicus caucasicus*, *Mesobuthus eupeus eupeus*, *Mesobuthus gibbosus*, *Euscorpium (Euscorpium) carpathicus*, *E. (Euscorpium) mingrelicus*, *E. (Polytrichobothrius) italicus*, *Calchas nordmanni*, *Iurus asiaticus*, and *Scorpio maurus fuscus* are the scorpion species that exists in our country, Turkey.¹¹

Scorpion envenomation occurs most commonly during the summer months.² Onset of systemic symptoms occurs in the first 4 h of the sting.⁶ Scorpion venom is composed of many different fractions that can vary among different species.⁶ For example, the venom of *Centruroides* species contains neurotoxins that can cause blocks in transportation of the ions, sodium and potassium, which will result in a block in transmission of impulses through neurons and muscle cells.^{4,6,10} Different grading systems are used to evaluate the envenomation, such as mild, moderate, severe, or grades I–IV according to the severity of the symptoms.¹²

Envenomation is said to be mild in cases presenting with local manifestations only, including pain, localized paresthesias or burning, very mild local

edema, and localized sweating.^{6,10} In moderate envenomation, patients are presented with cholinergic manifestations. In severe cases, cardiac and pulmonary failure, pancreatitis, upper gastrointestinal bleeding, and also cerebral edema¹³ can be seen. Hyperglycemia is common with moderate to severe envenomation, whereas hypopotassemia may occur in some cases.^{6,10} Like in other insect envenomations, children are more likely to develop systemic manifestations than adults, and the majority of published cases of severe or fatal envenomation involve children under the age of 10 years.^{7,12}

No relationship between site of sting and development of systemic toxicity was found. However, the likelihood of toxicity is said to increase with the number of stings sustained by the patient. And pregnancy in sting victims neither predispose to any greater incidence of toxicity nor to fetal distress, but diabetic and hypertensive patients appeared to be at higher risk.¹² Death results most commonly from left heart failure and pulmonary edema.¹⁴ Anecdotal cases of acute renal failure, hemolytic-uremic syndrome, hemiplegia, cerebral hemorrhage, endocarditis following scorpion stings were reported.^{5,7,15,16}

The treatment is mainly based on symptomatic approaches. Scorpion antivenin specific for some species are available that is given intravenously in severe cases with systemic manifestations in adults and concomitantly with α -blockers almost to all pediatric patients because of the severity of the disease.^{6,10,17} Some authors advocates the benefits of antivenin in treatment.¹⁷ However, systemic administration of scorpion antivenin irrespective of clinical severity is also said not to alter the clinical course of scorpion sting and the beneficial effect of such therapy is still a dilemma.¹⁷ Nowadays, Prazosin is preferred instead of antivenom because it acts

as a pharmacological and physiological antidote to scorpion venom actions.¹⁸

As it is seen in similar reports, scorpions' being nocturnal arthropods,¹⁷ both of our patients were stung at night, in the summertime, in rural areas. In the first case, findings consisted with coronary ischemia is supposed to be resulting from circulating adrenergic catecholamines. The first patient had no history of cardiac disease or hypertension and coronary angiography showed no vascular pathology, although she had depressed ST segments in all derivations except avR where ST segment was elevated. Her cardiac biomarkers were all elevated and suggesting a non-ST elevation myocardial infarction. The second case with quadriparesia and disartria had hypopotassemia. He was given antivenin first; neurological improvement was achieved but did not return to normal. In the literature, it is mentioned that hypopotassemia is not rare and usually resolves after antivenin treatment; hence, additional potassium replacement is not necessary.¹⁹ But in our case, potassium was given to resume normal motor activity because antivenin infusion did not provide enough neurologic healing.

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Conclusion

Because fatal cardiac pathologies including cardiac arrhythmias and myocardial injuries may occur after scorpion sting as in our first case, it is wise to obtain initial and following ECGs of such patients to eliminate or diagnose cardiac injuries. We also offer to evaluate cardiac biomarkers of these patients to exclude non-ST elevation myocardial infarction following sting. An electrolyte imbalance, especially hypopotassemia, is not rare after scorpion sting and may cause neurologic abnormalities, such as motor dysfunctions and paresthesias if it is severe. As it was mentioned before, antivenin therapy is usually the best way and sufficient to correct hypopotassemia, but in serious cases, especially those who have respiratory depression, potassium replacement may necessitate. Because grave results may occur, to obtain blood samples for electrolyte levels and starting replacement therapy besides antivenin as soon as possible when indicated will be life-saving. It is important not to forget scorpion sting as a possible cause of quadriparesia or speech abnormalities with or without any detected hypopotassemia because sometimes the victim cannot describe the insect or even being stung after the event.

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