

Severe hemoglobinuria due to *Hemiscorpius enischnochela* (Scorpiones: Hemiscorpiidae) envenomation from South of Iran



Mehran Shahi¹, Seyed Hamid Moosavy², Hossein Sanaei-Zadeh^{3*}

¹Department of Medical Entomology & Vector Control, School of Public Health, Infectious & Tropical Diseases Research Center, Hormozgan Health Institute, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

²Department of Internal Medicine, Hormozgan University of Medical Science, Bandar Abbas, Iran

³Emergency Room, Division of Medical Toxicology, Hazrat Ali-Asghar Hospital, Shiraz University of Medical Sciences, Shiraz, Iran

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***Corresponding author:** Hossein Sanaei-Zadeh,
Email: sanaeizadeh@sums.ac.ir

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Abstract

Objective: Scorpion stings are common in tropical regions of Iran. *Hemiscorpius enischnochela* are distributed in southern part of Iran. The venom of this scorpion causes severe hemolysis, hemoglobinuria, and occasionally death.

Case Presentation: This report describes the clinical manifestations of envenomation by *H. enischnochela* in a 3-year-old boy from Ruydar city in south of Iran.

Conclusion: Special attention should be paid to the painless stings of yellow scorpions and more studies are needed to set out a protocol for the management of these cases in areas with this envenomation to be a common one.

Keywords: Hemiscorpius, Scorpion Sting, Hemoglobinuria, Iran

Introduction

Scorpion stings and envenomation are common dilemma in the Middle East (1). Scorpion venom contains various substances such as neurotoxins, cardiotoxins, nephrotoxins and hemolytic toxins (2). Clinical complications including cerebral edema, subarachnoid hemorrhage, encephalopathy, hemorrhagic and non-hemorrhagic strokes, and cortical necrosis have been reported following scorpion stings (3). Clinical features of the envenomation depend on the scorpion species, lethality, and dose of venom received at the time of sting (4). Different species of *Hemiscorpius* scorpions have been reported from Africa (Eritrea, Somalia and Egypt) and Asia (Iran, Iraq, Oman, Pakistan, Saudi Arabia, Yemen, United Arab Emirates, and Yemen) (5, 6). *Hemiscorpius lepturus* (Gadim), *Hemiscorpius acanthocercus*, and *Androctonus crassicauda* are the most common dangerous scorpions in Iran (7-10). The clinical manifestations of *H. lepturus*, *H. acanthocercus*, and *A. crassicauda* envenomations are

shown in Table 1 (4). The highest incidence of scorpion sting is in the southern and western provinces of Iran including Khuzestan, Sistan and Baluchistan, Hormozgan, Bushehr, and Ilam (11). In Iran, most epidemiologic and clinical studies have been conducted on *H. lepturus* species and other species of this genus are unknown. According to the best of our knowledge, it appears that no report of clinical manifestations of sting by *H. enischnochela* has been published. This report describes the signs, symptoms and complications of envenomation by this scorpion.

Case Presentation

A 3-year-old boy from Ruydar city in south part of Iran was stung by a yellow scorpion with broad claws with dark tips on his neck and left thumb 3 hours before admission to the emergency department of children's hospital, Hormozgan University of Medical Sciences, Bandar Abbas, Iran. The sting site had no pain, erythema, swelling, tenderness, and warmth. The patient was fully alert, nontoxic, not



Table 1. Clinical manifestations of envenomation by three most dangerous scorpions of Iran

Scorpion species	Clinical manifestations of the sting
<i>Hemiscorpius lepturus</i> (Gadim)	Local: minor to mild local pain, local pruritus, erythema, inflammation, ecchymosis, severe swelling, blisters, cellulitis, extensive skin necrosis at the site of the sting. Local or generalized urticaria. Systemic: drowsiness, fatigue, irritability, restlessness, hyperthermia, pallor, sweating, headache, abdominal pain, nausea, vomiting, hypotension, cool extremities, tachycardia, muscle spasms, seizure. Laboratory: leukocytosis, microscopic hematuria, hemoglobinuria, myoglobinuria (rhabdomyolysis), proteinuria, hemolytic anemia, elevated liver enzymes, increased PT and PTT, DIC, HUS, acute renal failure
<i>Hemiscorpius acanthocercus</i>	Similar to the <i>H. lepturus</i> , one death has been reported
<i>Androctonus crassicauda</i>	Local: local burning pain at the site of the sting. Systemic: due to the increased release of the acetylcholine and catecholamines: drowsiness, irritability, restlessness, decreased level of consciousness, seizure, miosis, tachypnea, excessive sweating, salivation, diarrhea, nausea, vomiting, urination, severe abdominal cramps, priapism, limb numbness, blurred vision, tachycardia, hypertension, hyperthermia, filiform pulse, hypotension, hypothermia, cool extremities, decreased tendon reflexes, cyanosis, excessive thirst, ECG changes, ARDS, melena, bloody vomiting Laboratory: leukocytosis, granulocytosis, lymphopenia, glucosuria, hemoglobinuria, proteinuria, mild increased PT, PTT and INR, hypocalcemia.

PT: prothrombin time; PTT: Partial thromboplastin time; DIC: Disseminated intravascular coagulation; HUS: Hemolytic uremic syndrome; ECG: Electrocardiogram; ARDS: Acute respiratory distress syndrome; INR: International normalized ratio.

Data were obtained with permission from Sanaei-Zadeh et al (4).

pale, and symptom-free on the first day of admission. He received three vials (IV) of scorpion antivenin (because of the suspicion of Gadim stings) (12). On the second day, he experienced confusion abdominal pain, nausea, headache, fever, and red to brown urine color. Because of the severity of his disease, the patient was hospitalized in ICU ward. The scorpion he had brought with was an adult male *H. enischnochela* which was preserved in 75% ethanol and deposited in medical entomology museum of Bandar Abbas health school (Figure 1). Identification of the scorpion species was performed by morphological characteristics according to the latest publication of key diagnostics. Identification was carried out using a Nikon XN model stereomicroscope. Publication of Monod and Lourenco was used as identification key (6). The patient's laboratory data are shown in Tables 2 and 3.

During ICU admission the patient received three more intravenous (IV) scorpion antivenin vials, urinary alkalinization, IV hydrocortisone, IV clindamycin, packed cell, prazocin (PO), platelet (IV), acetaminophen (PO), and intramuscular tetabulin. He was discharged five days



Figure 1. Adult male *H. enischnochela* from Hormozgan province, South of Iran

after admission in good general condition.

Discussion

In south-western Iran, most of the mortalities of the scorpion envenomation are associated with *H. lepturus* stings (13). This scorpion is one of the most dangerous yellow colored scorpions in Iran (8-10). Not only *H. lepturus*, but probably other *Hemiscorpius* species can also cause similar clinical manifestations In Iran (6). The venom of *H. lepturus* is highly cytotoxic and hemolytic which can cause cutaneous manifestations, laboratory abnormalities, and systemic manifestations including hemolysis, renal failure, and death (Table 1) (4, 8). The data of tables 2 and 3 show that the patient's hematologic and biochemical parameters are changed. Other authors and researchers have reported these findings in the patients stung by *H. lepturus* (13-15). The results of the laboratory tests in this case showed severe hemoglobinuria (3+). The red blood cell (RBC) count decrease in *H. lepturus* associated envenomation. This was reported similarly by other authors and researchers following *H. lepturus* sting. Also, severe hemolysis due to *H. lepturus* envenomation was reported by Pipelzadeh et al (14). Emam et al showed reduction in the RBC count of the patients stung by *H. lepturus* in southeast part of Iran (16). They also reported that partial thromboplastin time (PTT), Prothrombin time (PT), hemoglobin (Hb), RBC, and platelet (PLT) counts should be considered as important indicators in *H. lepturus* envenomation (17). Contrary to the suggestion of these authors, our patient's PT and PTT were not prolonged. It has been shown that the PT is often increased and PTT may be prolonged only in DIC due to *H. lepturus* and *H. acanthocercus* envenomations (4, 5). However, increased lactate dehydrogenase (LDH), decreased RBC count and

Table 2. Urinalysis test results of the patient

The day of admission	First	Second	Third	Fifth			
Hour	16:11	00:28	7:59	13:12	16:35	9:23	6:08
Haemoglobin	-		1+	3+	3+	-	
Color	Yellow	Yellow	Yellow	Reddish	Reddish	Brown	Yellow
Appearance	Clear	Clear	Semi clear	Turbid	Semi clear	Semi clear	Clear
pH	6	5	5	7	7	9	5
Proteins	-	-	-	3+	2+	1+	-
Glucose	-	-	-	-	2+	-	-
Keton	-	-	-	-	-	1+	-
Blood	-	-	-	Trace	-	3+	-
WBC	1-2	0-1	0-1	2-3	1-2	22-25	6-8
RBC	0-1	0-1	0-1	3-4	1-2	Many	4-5
Epithelia cells	0-1	0-1	0-1	1-2	1-2	1-2	4-6
Cast	-	-	-	-	-	Granular 3-4	-
Bacterial	-	-	-	-	-	Few	Few
Amorph	-	-	-	-	-	-	-
Urobilinogen	-	-	-	-	-	-	-
WBC clamp	-	-	-	-	-	2-3	-

WBC: white blood cell; RBC: red blood cell.

Table 3. The patient's laboratory data

The day of admission	First	Second	Third	Fourth		
Hour	16:11	13:12	16:13	9:31	23:26	18:13
PTT (s)	33	45		32		
PT (s)	13	16		13		
BUN (mg%)	10.3					
Cr (mg%)	0.3			0.3		
SGOT (μ/L)	84			84		
SGPT (μ/L)	18			18		
WBC (10 ³ /μL)	9.4	9.4	6.0	10.3	9.4	9.4
RBC (10 ⁶ /μL)		4.11	5.49	4.62	4.11	4.18
MCV (fL)		71.5	64.8	66	71.5	72.2
MCH (pg)		22.9	28.9	19.3	22.9	22.5
MCHC (g/dL)		320	28.9	29.2	32	31.1
Hb (g/dL)	9.4	9.4	10.3	8.9	9.4	9.4
HCT (%)		29.4	35.6	30.5	29.4	30.2
PLT (μL)	2200	57000	222000	117000	57000	123000
TBIL (mg%)	3.2			3.2		
CRP (mg/L)	+3	3+		3+		
ESR (mm/h)	11			11		
ALP (μ/L)				648		

PTT: Partial thromboplastin time; PT: Prothrombin time; BUN: Blood urea nitrogen; Cr: Creatinine; SGOT: Serum glutamic-oxaloacetic transaminase; SGPT: Serum glutamic pyruvic transaminase; WBC: White blood cell; RBC: Red blood cell; MCV: Mean corpuscular volume; MCH: Mean corpuscular hemoglobin; MCHC: Mean corpuscular hemoglobin concentration; Hb: Hemoglobin; HCT: Hematocrit; PLT: platelet; TBIL: Total bilirubin; CRP: C-reactive protein; ESR: Erythrocyte sedimentation rate; ALP: Alkaline phosphatase

Hb concentration, and increase in indirect bilirubin (IBILI) level are the indicators of hemolysis. Unfortunately, in our case, the LDH and IBILI levels were not checked. We are aware this is a limitation of our case report that should be addressed in the future studies. In accordance with the above-mentioned researchers' reports, in our case some laboratory parameters were abnormal. Biochemical tests showed that serum glutamic-oxaloacetic transaminase (SGOT), alkaline phosphatase (ALP), and total bilirubin (TBIL) increased. In contrast, Radmanesh reported normal levels of SGOT in the patients stung by *H. lepturus* (18). In our case *H. enischnochela* envenomation has been resulted in an increase in serum ALP, SGOT, and SGPT levels. It seems that increased SGOT, SGPT and ALP levels in the stung patients are important markers. This data may be used as a factor signifying *Hemiscorpius* scorpion stings. Radmanesh and Pipelzadeh et al reported hemoglobinuria due to *H. lepturus* sting (8,14). Fever, confusion, hemoglobinuria and decreased Hb levels were observed in our case. Jalali and Rahim have also recorded these signs and symptoms after *H. lepturus* envenomation (19). The findings in this report indicate that the clinical manifestations of *H. enischnochela* envenomation are almost similar to the *H. lepturus* and *H. acanthocercus* envenomations. Therefore, the *H. enischnochela* is one of the most dangerous species in the southern districts of Iran whose envenomation can be life-threatening. It should be emphasized that the diagnosis of *Hemiscorpius* species envenomation is significant, since unlike other yellow Iranian scorpions, their stings are pain-free and may be considered unimportant. Therefore, the patients may be discharged from the hospital or be referred to emergency department with hemoglobinuria or cutaneous manifestations when it is too late for scorpion antivenin administration (20). The differentiation between *Hemiscorpius* species and other yellow Iranian scorpions is their wide claws with dark tips and their painless stings (20). In conclusion, pain-free stings of yellow scorpions with wide claws and dark tips should be taken seriously.

Conclusion

Hemiscorpius envenomation is one of the most significant medical problems in southern part of Iran. In the early hours post envenomation, there are no significant clinical manifestations. However, after about 12 hours, symptoms of envenomation include dizziness, nausea, vomiting, abdominal pain, headache, and red to brown urine color may manifest. Hemolysis and hemoglobinuria may occur up to a week after the stings of *Hemiscorpius* species. It seems that the venom of *H. enischnochela* has hemolytic and nephrotoxic effects that cause RBC hemolysis, hemoglobinuria, proteinuria, and microscopic hematuria. Our findings indicate that the clinical manifestations of *H. enischnochela* envenomation are almost alike to the *H. lepturus* and *H. acanthocercus* envenomations. Therefore,

the *H. enischnochela* is one of the most dangerous yellow species in the southern districts of Iran and can be life-threatening. We suggest more studies on this scorpion species for the management of this scorpion envenomation.

Authors' contributions

Each author contributed equally to study design, drafting article, reading critically and accepted finally proof.

Ethical issues

Informed consent was obtained from the parents' patient for publication of this report.

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