

## Research Paper: Clinical Manifestations of *Compsobuthus Persicus* Scorpion Enven- omation in Southern Iran



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## ABSTRACT

**Background:** *Compsobuthus Persicus* scorpion is endemic to Iran and exists in Hormozgan, Bushehr and Fars provinces. The aim of this study was to assess the clinical manifestations of envenomation by *C. persicus* and the effect of its venom on the biochemical, hematological, and urinalysis parameters of the stung patients.

**Methods:** In this analytical and retrospective study, all medical charts of patients who had been stung by *C. persicus* and admitted to the Emergency Departments of Shahid Mohammadi and Children's Hospital of Bandar Abbas, Iran, between May 2014 and November 2015 were assessed. Data from the patients' test results were recorded including age, gender, clinical manifestations, urinalysis, blood chemistry, and Complete Blood Cell count (CBC).

**Results:** A total of 275 cases of scorpion stinging were assessed. Of them, 55 cases consisting of 28 males (50.9%) and 27 females (49.1%) at ages of 2 to 57 years old had been stung by *C. persicus*. Localized pain was the most frequent presenting patients' complaint (90%). The most frequent symptom reported was vertigo (70%). However, the results of the urinalysis, biochemical, and hematological parameters of the blood samples were in normal ranges.

**Conclusion:** The severity of envenomations by *C. persicus* was mild and the biochemical and hematological parameters of the patients' blood and urinalysis were within normal ranges, and there is no need for antivenin administration.

**Keywords:** Clinical manifestations; Iran; Envenomation; Venom; *Compsobuthus Persicus*; Scorpion sting

## Introduction

The scorpion stinging is one of the most important medical complaints in southern Iran [1-4] where about 84%, 1.5%, and 5% of the species belong to the scorpion family of Buthidae, Hemiscorpidae, and Scorpionidae, respectively [5]. Numerous scorpion species are found in Iran, 13 of which are medically important [6-9]. Also,

23 scorpion species are endemic to Hormozgan province in Iran. Please see Table 1 for details.

Every year, 50,000 scorpion stung cases occur in Iran, most of which reported from Khuzestan and Hormozgan provinces [10, 11]. All of the deaths induced by scorpion envenomations have also been reported from Khuzestan, Siestan and Baluchestan, Kerman, and Hormozgan provinces [3, 12-17]. In Iran, a few scorpion species cause severe envenomations in human subjects. The

**Table 1.** Major clinically dangerous scorpion species found in Iran

No.	Species
1	<i>Androctonus crassicauda</i>
2	<i>Apisthobuthus petrigusercus</i>
3	<i>Compsobuthus matthiesseni</i>
4	<i>Hemiscorpius acanthocercus</i>
5	<i>H. lepturus</i>
6	<i>Hottentotta jayakari</i>
7	<i>H. saulcyi</i>
8	<i>H. zagrosensis</i>
9	<i>Mesobuthus caucasicus</i>
10	<i>M. eupeus</i>
11	<i>Odontobuthus doriae</i>
12	<i>Orthochirus scrobiculosus</i>
13	<i>Hemiscorpius enischnochela</i>
1	<i>Hemiscorpius Shahii</i>
2	<i>Buthacus macrocentrus</i>
3	<i>Compsobuthus Persicus</i>
4	<i>C. plutenkoi</i>
5	<i>H. acanthocercus</i>
6	<i>H. enischnochela</i>
7	<i>H. gaillardi</i>
8	<i>Hottentotta jayakari</i>
9	<i>H. lepturus</i>
10	<i>H. persicus</i>
11	<i>Hottentotta saulcyi</i>
12	<i>Iranobuthus krali</i>
13	<i>Mesobuthus eupeus persicus</i>
14	<i>M. phillipsii</i>
15	<i>Nebo henjamicus</i>
16	<i>Odontobuthus bidentatus</i>
17	<i>O. tavighiae</i>
18	<i>O. doriae</i>
19	<i>Orthochirus farzanpayi</i>
20	<i>O. stockwelli</i>
21	<i>O. varius</i>
22	<i>Razianus zarudnyi</i>
23	<i>Sasanidotus gracilis</i>

References: \* Medically important scorpion species found in Iran [6-9]; and \*\* Endemic to Hormozgan [18-20]

most dangerous scorpions found in western and southwestern areas of Iran are *H. lepturus*, *H. acanthocercus*, *H. enischnochela* and *A. crassicauda* [13, 14].

Little information is available on the clinical manifestations of the stinging and venom effects of some scorpions in the blood and urine samples of the human victims in Iran [6]. According to studies, there are no data available on the clinical manifestations of the envenomations and the effects of *C. persicus* scorpion venom on the clinical parameters of the stung victims (Figure 1). Therefore, the aim of this study was to evaluate the clinical manifestations and effects of *C. persicus* scorpion venom on the biochemical and hematological indices of the blood and urine samples of the stung subjects.

## Materials and Methods

In this analytical and retrospective study, laboratory and clinical data recorded in medical charts of patients who were stung by *C. persicus* and admitted to the Emergency Departments of Shahid Mohammadi and Children's Hospital of Bandar Abbas, Iran, were reviewed between May 2014 and

November 2015. Scorpion samples also were collected and identified by an expert entomologist.

The examined data included clinical manifestations, urinalysis results, such as color, appearance, pH, protein, glucose, blood, White Blood Cell (WBC), Red Blood Cell (RBC) counts, Hemoglobin (Hb); biochemistry tests of the blood results; urea, Blood Urea Nitrogen (BUN), creatinine, sodium and potassium test results, complete Blood Cell Counts (CBC), Hemoglobin (Hb), Hematocrit (HCT), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Hemoglobin Concentration (MCHC), and Platelets Count (PLT).

**Scorpion species identification:** Scorpions, brought by afflicted patients, were kept in 70% alcohol and sent to the laboratory at the Department of Medical Entomology & Vector Control, School of Public Health, Hormozgan Health Institute, Hormozgan University of Medical Sciences, Bandar Abbas, Iran. Identification of species was performed according to the established guidelines [18, 21], using a Nikon XN model stereo microscope. The study was approved by the Committee on Ethics in Research, Medical

**Table 2.** Urinalysis results of patients stung by *C. persicus* scorpion in the current study

Parameter	Number of Patients	%	Result
Hb	55	100	Negative
Color	55	100	Yellow
Appearance	49	89.1	Clear
	5	9.1	Semi-turbid
	1	1.8	Turbid
Protein	55	100	Negative
Glucose	48	87.3	Negative
	7	12.7	Trace
Blood	50	90.9	Negative
	5	9.1	Trace
WBC	54	98.2	Normal
	1	1.8	High
RBC	55	100	Normal

Hb: Hemoglobin; RBC: Red Blood Cells; WBC: White Blood Cells

**Table 3.** Variations of blood biochemical parameters in patients stung by *C. persicus*

Parameter	Number of Patients	Min.	Max.	Mean±SD
Cr (mg/dl)	42	0.3	1.2	0.64±0.20
Na <sup>+</sup> (mEq/L)	47	137	148	140.30±2.32
K <sup>+</sup> (mEq/L)	47	3.7	37.0	4.98±4.79
BUN (mg%)	46	4.2	18.0	9.82±2.87

Cr: Creatinine; Na<sup>+</sup>: Sodium; K<sup>+</sup>: Potassium; BUN: Blood Urea Nitrogen

**Table 4.** Hematological parameters observed in patients stung by *C. persicus* scorpions

Parameter	Number of Patients	Min.	Max.	Mean±SD
WBC (10 <sup>3</sup> /μL)	48	2.5	17.7	7.40±2.73
RBC (*10/L)	48	3.83	5.94	4.77±0.53
Hb (gr/dL)	48	8.6	15.0	11.26±1.40
HCT (%)	48	56.6	94.0	75.43±8.84
MCV (fL)	48	56.6	94.0	75.43±8.84
MCH (pg)	48	17.8	30.2	23.57±3.41
MCHC (g/dL)	48	3.7	36.0	30.74±4.41
PLT (*10/L)	48	134	466	272.42±68.53

WBC: White Blood Cells Count; RBC: Red Blood Cells Count; Hb: Hemoglobin; HCT: Hematocrit; MCV: Mean Corpuscular Volume; MCH: Mean Corpuscular Hemoglobin; MCHC: Mean Corpuscular Hemoglobin Concentration; PLT: Platelets Count

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**Statistical analyses:** Graphs were plotted using Excel software, version 2017. Data analyses were performed, using SPSS statistical software, version 25.

## Results

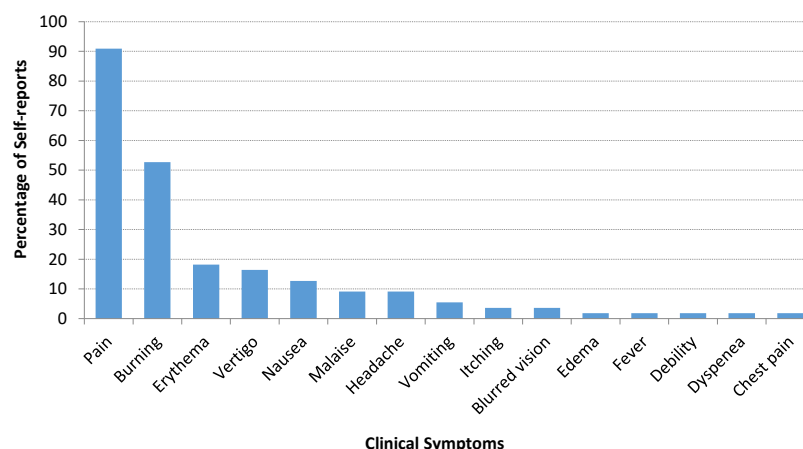
In total, 275 patients who were stung by scorpions and admitted to the hospitals were investigated. Of these, 55 cases had been stung by *C. persicus*, which consisted of 28 (50.9%) male and 27 (49.1%) female at ages ranging from 2 to 57 years old. The clinical symptoms observed and the percentages of patients involved are presented in [Figure 2](#). The results of urinalysis are listed in [Table 2](#). [Tables 3](#) and [4](#) present the patients' biochemical and hematological parameters, respectively.

## Discussion

Our findings indicated that *C. persicus* with a frequency of 18% was one of the most frequent causes of scorpion envenomations. Dehghani et al. reported that *C. matthieseni* was a major agent of scorpion stinging (20.6%) in Khoozestan province [22]. So far, 11 scorpions belonging to *Compsobuthus* species have been reported from the southern areas of Iran. These species are found in Bushehr, Fars, and Hormozgan provinces [5, 23, 24]. This scorpion genus belongs to the Buthidae family, the color of which is bright to dark yellow and 28-37 mm in length ([Figure 1](#)) [18, 21]. There are 51 scorpion species identified in Iran, 13 of which are clinically dangerous ([Table 1](#)) [9, 14].

This article is the first report of stings by *C. persicus* species in Iran. The species is endemic to Iran [25] and has been found frequently in Hormozgan [23], Bushehr, and Fars

**Figure 1.** Female scorpion, *Compsobuthus Persicus*



**Figure 2.** Clinical symptoms reported by the patients following *C. persicus* scorpion stinging, as observed in this study

provinces [25]. The most commonly reported clinical symptoms in patients stung with *C. persicus* were pain and burning sensation at the stung sites. Other less prevalent symptoms include erythema, vertigo, nausea, malaise, headache, vomiting, itching, and blurred vision. The least frequently reported clinical sign was edema, with the associated symptoms being fever, weakness, dyspnea, and chest pain.

Clinical symptoms of scorpion stinging are related to various factors including species, size, and age of scorpion, the time elapsed between sting to hospital admission, the age of the patient, the site of the sting, and allergic and systemic reactions to the venom [26, 27]. The results of the urinalysis in the patients including color, pH, protein, glucose, blood, WBC, RBC, and Hb were normal and no changes were observed. The urine appearance in five patients (9%) was semi-turbid. All of these patients were recovered without a subsequent renal failure. In contrast, it has been reported that the urinalysis results in most patients who are stung by *H. lepturus*, *H. enischnochela*, and *H. acanthocercus* showed positive evidence of proteinuria, blood, intact RBCs, and rarely myoglobinuria. Moreover, glucosuria, hemoglobinuria, and proteinuria have been reported in patients stung by *A. crassicauda*. Also, hematuria in patients stung by *C. matthiesseni* is questionable [6].

Based on our results, it appears that *C. persicus* venom does not cause abnormal urine changes. Also, the results of patients' blood biochemical analyses demonstrated that the mean serum levels of such parameters as Cr, Na<sup>+</sup>, K<sup>+</sup>, BUN, and urea were within normal ranges. Thus, it appears that the *C. persicus* venom had no significant effect on the biochemical parameters of the victims' blood. The results of hematologic tests for all patients showed that *C. persicus* venom did not make significant alterations in the WBC, RBC, Hb, HCT, MCV, MCH, and MCHC levels. Some Buthidae scorpions are known to be neurotoxic; however,

no severe neurological symptoms were reported in any of the patients stung by *C. persicus*. Based on our findings, it appears that the clinical symptoms of envenomation by *C. persicus* scorpions are relatively mild in the stung patients.

## Conclusions

The severity of poisoning with the *C. persicus* venom, as documented in this study, was mild. The most commonly reported symptoms were pain and burning sensation at the stung sites. Biochemical and hematological parameters from the analyses of the patients' blood and urine were within normal ranges. Therefore, there is no need for anti-venin administration [28].

## Ethical Considerations

### Compliance with ethical guidelines

This study was approved in 2015 by the Committee on Ethics in Research, Medical School, Hormozgan University of Medical Sciences (Registered #: HUMS.REC.1394.83).

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## Author's contributions

Both authors contributed equally in preparing all parts of the research.

## Conflict of interest

The authors declare no competing or conflict of interests with any internal or external entity.



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