Original Article

An Epidemiological and Clinical Study on Scorpionism in Hospitalized Children in Khuzestan, Iran

***B Vazirianzadeh [1], F Farhadpour [2], M Hosseinzadeh [3], M Zarean [4], SA Moravvej [5]**

[1]Department of Medical Entomology and Infectious and Tropical Diseases Research Centre, Ahvaz Jundishapour University of Medical Sciences, Ahvaz, Iran
[2]Department of Medical Entomology, Shiraz University of Medical Sciences, Shiraz, Iran
[3]Department of Pediatrics, College of Medicine, Ahvaz Jundi Shapour University of Medical Sciences, Ahvaz, Iran
[4]Department of Parasitology and Mycology, Ahvaz Jundi Shapour University of Medical Sciences, Ahvaz, Iran
[5]Department of Medical Entomology,Ahvaz Jundishapour University of Medical Sciences, Ahvaz, Iran

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Abstract

Background: Scorpion sting is a public health problem in Khuzestan, South-West Iran. The aims of the current study were to monitor the hospitalized children, due to scorpion sting, and releasing more clinical and epidemiologic data related to scorpionism in this Province.

Methods: In this retrospective study, the data of scorpion sting victims, among the hospitalized children in Abuzar Children Hospital of Ahvaz Jundi Shapur University of Medical Sciences, was analyzed from the points of epidemiological and clinical aspects in 2006.

Results: The scorpion species of 18 files out of 57 were recognized accurately, using Farzanpay's keyof Iranian scorpions, as *Androctonus crassicauda* (Scorpionida: Buthidae) and *Hemiscorpious lepturus* (Scorpionida: Hemiscorpiidae).

Conclusion: The most scorpionism emergencies among the children in the Khuzestan should be paid to those species. However, *H. lepturus* sting emergencies are in the top of attention among the children.

Keywords: Scorpion, *Androctonus crassicauda*, *Hemiscorpius lepturus*, Scorpionism, Children, Iran

Introduction

Scorpion sting is a public health problem in Khuzestan, South West Province of Iran. A few epidemiologic and clinical studies related to scorpionism have been documented in this area regarding the children. There have been released different data in this case.

One of the largest populations of scorpionism victims in Khuzestan are the children. Vazirianzadeh et al. (2008) have reported that the children, after the housekeepers, are the largest population stung by scorpions. Vazirianzadeh et al. (2005) and Chitnis et al. (1994) have obtained the similar results to the above study from Khuzestan hospitals. Pipelzadeh et al. (2006) reported that 66.4% of victims were less than 20 years old and 39.6% under 10 years old. They also reported that *H. lepturus Hemiscorpius leptururs* (Peters, 1861) is responsible for 10–15% of scorpion sting. However Vazirianzadeh et al. (2008), Chitnis et al. (1994) and Pipelzadeh et al. (2006) reported that *H. lepturus* was responsible for 30% of scorpion stings.

***Corresponding author:** Dr Babak Vazirianzadeh, E-mail: babakvazir@yahoo.co.uk

In a retrospective study which conducted by Mir Dehghan et al. (2001) among 1538 scorpion envenomed children in Abuzar Children's Hospital, Ahvaz Jondishapour University of Medical Sciences between 1994 and 1999, 17.5% of these children were stung by *H. lepturus* and the remaining were due to other scorpion species.

Children potentially are in the greater risk of being damaged and fatal conditions such as developing severe cardiac, respiratory and neurological complications following scorpion sting (Mahaba, 1997, Bonsak et al, 2009).

The information regarding to the hospitalized children of scorpion sting is also not too much in Iran. Therefore, the aims of the current study were to monitor the hospitalized children, due to scorpion sting, and releasing more clinical and epidemiologic data related to scorpionism in Khuzestan.

Materials and Methods

The data of scorpion stings, either epidemiologic or clinic, has obtained from files of both health care and children emergency departments from 57 hospitalized scorpions stung children in the Abuzar Children's Hospital, Ahvaz Jondishapour University of Medical Sciences during spring 2006. The data belonging to the definite scorpion species were selected using Farzanpay's (1987) key of Iranian scorpions. Then the related data were described epidemiologic and clinically using percentage basis and crude data. The epidemiologic data were geographical locality of the event, spices of scorpion, age distribution of patients, sex of patients and sting sites in hospitalized children. The clinic data were divided into 3 categories: clinic signs and symptoms, lab data and treatments. The signs and symptoms data were divided into local, respiratory, gastroenteritis, neurologic and the other data (fever and death).

Results

Totally 57 files (3 of them missed the age parameter) belonging to the children admitted to the emergency department of the hospital were monitored during spring 2006. Forty scorpion stung children (70.17%) were from city of Ahvaz (center of Khuzestan) and its villages and the rest 17 children were from other rural and urban regions of Khuzestan (29.81%). Thirty-three cases (82.5%) of Ahvaz belonged to the urban area; however the rest of 7 cases (17.5%) belonged to the rural area. The species of scorpions were recognized accurately as *Androctonus crassicauda* (Scorpionida: Buthidae) and *Hemiscorpious lepturus* (Scorpionida: Hemiscorpiidae) in 13 and 5 cases, respectively. Most of the patients were female (53.70%) and 46.29% were male. The related results are summarized in the Table 1 and 2.

Table 2 indicates that the 52.04% of the patients belonged to the 0–6 year old, 40.73% to the 7–12 year old and 3.70% to the 13–18 year old children. The range of age among the stung children by *A. crassicauda*, was 14 months–12 years old, and among the children, the stung children by *H. lepturus*, was 2–13 years old.

Table 3 shows frequency of sting site in the bodies of patients. It explains that 45.61% of stings have been taken place in the head, neck and trunk and the rest in the upper limbs and lower limbs.

Frequencies of signs and symptoms following stung are shown in the Table 4. The most frequent signs and symptoms data were skin disorders (erythema, rash and itching) regarding *H. lepturus* stung patients and gastroentritis (abdominal pain and diarrhea and vomiting) regarding *A. crassicauda* stung patients.

In the both cases of *A. crassicauda* and *H. lepturus* the most frequent of lab data were

haemoglobinuria among the child patients following stung with 53.84% and 80% of data, respectively. Hemoglobinuria were recorded among 35.89% and 43.85% of scorpion stung children regarding unknown species and totally, respectively. However, hematuria was the most frequent lab data among the child patients after hemoglobinuria in the case of *H. lepturus* stung patients with 60% frequency. Hematuria were recorded among 15.38% and 15.78% of scorpion stung children regarding unknown species and totally, respectively. There was not any hematuria recorded regarding *A. crassicauda* stung children in the current study.

Duration of hospitalization among the stung children by *A. crassicauda*, was 1–4 days. This duration for the stung children by *H. lepturus***,** was 2–9 days. This duration was 1–9 days among the stung children by unknown species.

All the children were discharged after recovery without death in 18 cases that are described above. However one death case has been recorded in the category of unknown species. The medications that were used as treatments among the stung children are in the Table 5.

Antivenin was used in 73.68% of the cases. However, calcium gluconate, diazepam, dexamethazone and phenobarbital were applied as the least medications.

Table 1. Distribution of scorpion stings according to locality, Abuzar Children's Hospital, Ahvaz Jondishapour University of Medical Sciences, Spring 2006

Locality		Scorpion stings according to locality							
		A. crassicauda		*H. lepturus*		Unknown species		Total	
		Number	%	number	%	number	%	Number	%
Ahvaz	Rural	6	10.52	-	0.00	1	1.57	7	12.28
	Urban	1	1.57	1	1.57	31	54.38	33	57.89
Khuzestan	Rural	6	10.52	4	7.01	3	5.26	13	22.80
	Urban	-	0.00	-	0.00	4	7.01	4	7.01

Table 2. Distribution of patients according to age and sex characteristics, Abuzar Children's Hospital, Ahvaz Jondishapour University of Medical Sciences, Spring 2006

Characteristics		Stung By Scorpions							
Age (yr)	Sex	*A. crassicauda*		*H. lepturus*		Unknown species		Total	
		Number	%	Number	%	Number	%	Number	%
0–6	♀	5	38.46	2	40	10	27.77	17	29.82
	♂	4	30.76	-	-	8	22.22	12	22.22
7–12	♀	2	15.38	1	20	9	25.00	12	22.22
	♂	2	15.38	-	-	8	22.22	10	18.51
13–18	♀	-	-	-	-	-	-	-	-
	♂	-	-	1	20	1	2.77	2	3.70
Total	♀	7	53.84	3	60	19	52.77	29	53.70
	♂	6	45.15	2	40	17	47.22	25	46.29

Table 3. Sting sites in hospitalized children in the Abuzar Children's Hospital, Ahvaz Jondishapour University of Medical Sciences 2006

Part of body	Frequency (%)
head, neck, trunk	45.61
upper limps(hands)	19.29
lower limp(legs)	35.08
total	100

Table 4. Frequencies of signs/symptoms following stung by scorpions, Abuzar Children's Hospital, Ahvaz Jondishapour University of Medical Sciences, Spring 2006

Clinical signs/ symptoms	Stung by scorpions							
	A. crassicauda		*H. lepturus*		Unknown species		Total	
	Number	%	Number	%	Number	%	Number	%
Local :								
pain	3	23.07	1	20	10	25.64	14	24.56
swelling	2	15.38	-	-	8	20.51	10	17.54
edema	-	-	-	-	5	12.82	5	8.77
erythema , rash and itching	-	-	3	60	14	35.89	17	29.82
cellolite	-	-	-	-	2	5.12	2	3.50
Respiratory:								
Respiratory distress	2	15.38	1	20	4	10.25	7	12.28
Gastroentritis:								
abdominal pain and diarrhea	1	7.69	-	-	2	5.12	3	5.26
vomiting	6	46.15	1	20	7	17.94	14	24.56
Sialorrehoea	-	-	-	-	1	2.56	1	1.75
Neurologic:								
convulsion	-	-	-	-	2	5.12	2	3.50
headache	-	-	1	20	-	-	1	1.75
unconscious	-	-	-	-	1	2.56	1	1.75
vertigo	-	-	1	20	2	5.12	3	5.26
Others:								
fever	2	15.38	-	-	11	28.20	13	22.80
death	-	-	-	-	1	2.56	1	1.75

Table 5. Medications that were used as treatments among the stung children among hospitalized children in Abuzar Children's Hospital, Ahvaz Jondishapour University of Medical Sciences, Spring 2006

Treatments	Stung by scorpions							
	A. crassicauda		*H. lepturus*		Unknown species		Total	
	Number	%	Number	%	Number	%	Number	%
Antivenin	12	92.30	3	60	27	69.23	42	73.68
Alkaline diuresis	10	76.92	5	100	17	43.58	30	55.10
Calcium gluconate	1	7.69	-	-	-	-	1	1.75
Diazepam	1	7.69	-	-	1	2..56	2	3.50
Phenobarbital	1	7.69	-	-	2	5.12	3	5.26
Antibiotic penicillin	-	-	-	-	2	5.12	2	3.50
Antibiotic Kefline	-	-	-	-	4	10.25	4	7.01
Dexamethazone	-	-	-	-	1	2..56	1	1.75
Atropine	-	-	-	-	2	5.12	2	3.50

Discussion

Scorpionism is a widespread phenomenon in the tropical and sub-tropical regions. Soulaymani et al. (2002) have also expressed that 90% of the fatal scorpionism victims were younger than 15 years old, in the south and central parts of Morocco. Children younger than 15 years represented 30% of the stung population per year. Ozkan and Kat (2005) in a study of Turkey have also explained that 25% of cases due to scorpion stings belonged to the age group of 0–14 years old. Jarrar and Al-Rowaily (2008) have reported that 21.8% of scorpion sting cases were younger than 16 years old in a study from Saudi Arabia. Yildizdas et al. (2008), Ghalim et al. (2000) and Goyffon et al. (1982) have discussed that scorpion stings represent an important and serious public health problem worldwide due to their high incidence and potentially severe and often fatal clinical manifestations, especially among children.

According to the classification of Abroug et al. (1994) the clinical severity was mainly class II envenomation including 46.15% vomiting (as simpatic or parasipatic response) and 60% hematuria among *A. crassicauda* or *H. leptorus* stung children, respectively as the major systemic signs, which were seen in the current study. However, the clinical severity was stronger in the *H. lepturus* stung cases, because of hematuria. This is confirmed by Radmanesh studies (1987, 2002). The results of this study showed that the hematuria was a main sign of systemic toxicity among *H. lepturus* stung children rather than *A. crassicauda* stung children whom were suffered of vomiting. Reporting hemoglobinuria among the *A. crassicuda* stung children is not accordance to the Radmanesh studies (1987, 2002) which mentioned only Hemiscorpioiids caused hemolysis signs among the patients. This could be explained by difference scorpion systematic between two species, which *A. crassicauda* belonging to Buthidae family in contrast to *H. lepturus* stung belonging to Hemiscorpioiidae family.

Most of the patients were females (53.70%) and 46.29% were males. This rate is accordance with results of Vazirianzadeh et al. (2005) in Khuzestan. However, it is not consist with the results of Dehgani et al. in Kashan that they reported that the scorpion stung people were males (53.04%) than females (46.95%) (Dehghani et al. 2010). It is due to different methods and geographical locations in the two studies.

The results of this study approved that the 64.90% of scorpion stung people have been recorded in urban area which is confirmed that scorpionism in Khuzestan is going to be an urban problem. Vazirianzadeh et al. reported that the most of patients who referred to Ahvaz hospitals regarding scorpion stings had been stung by scorpions in urban area (Vazirianzadeh et al. 2008).

According to Mahaba (1997) the severity of symptoms and signs following scorpion stings are greater among infants than adults, significantly. Consequently, the treatments seem to be more important in infants and preschool children than in adults (Mahaba 1997). The severity of signs among hospitalized children in this study agrees with the results of Mahaba (1997). He explained that the greater number of stings to the head, neck and body among the children because of poor withdrawal reflex when suffering from a sting gives a chance to scorpions injecting more venin. In the current study 45.6% of stings happened in the head, neck and trunk.

The severity of hemolysis signs among the Hemiscorpioid stung children is greater than the *A. crassicauda* stung children. In addition, the hematuria has caused longer hospital duration in regarded to the children

with *H. lepturus* scorpionism than *A. crassicauda* stung children in the current study, however, the neurologic effects such as convulsion, laryngospasm and respiratory distress by *A. crassicauda* are more deadly among the children, totally.

Pipelzadeh et al. (2007) have reported that clinical signs and symptoms were both local and systemic among the 345 cases of scorpion stings. This confirms the findings in the current study. Also cutaneous findings including: erythema, echimosis, ulcer and necrosis among *H. lepturus* stung children, were recorded in this study. This is accordance to the findings of Pipelzadeh et al. (2007) and Radmanesh (1987, 2002).

Totally, 42 cases out of 57 scorpion stung children received antivenin of scorpions. This antivenin is a 5 ml polyvalent ampoule against 6 species including both *H. lepturus* and *A. crassicauda* and four other species: *Mesobuthus eupeus*, *Odonthobothus doriae*, *Hottentotta saulcyi* and *H. schach*. This is made in Razi Research Vaccine and Serum Institute, Iran. Except one case that leaded to death despite receiving the antivenin, in the other cases recovery was recorded in the current study. This confirms that using the antivenin is useful to treat the exposed children to scorpion stings. This is almost accordance to the results of Gajre and Gajre and Dammas (1999) that made a pessimist conclusion in the effectiveness of using the earliest species-specific antivenin because it reduces mortality and morbidity of scorpion stings in the cases of definite envenomation with scorpions.

The main of Afzali and Pezeshki (1999) results are similar to the obtained results of the current study. Afzali and Pezeshki (1999) have reported that the renal failure due to *H. lepturus* sting is a second phenomenon and the venom this species is not nephrotoxic. They have also explained that hemoglobinuria is the most important sign of *H. lepturus* sting which can be followed by renal failure. However they have recommended the scorpion sting in the face and body would lead to the renal failure than the scorpion sting in the other part of human body. The average age of patients in their study was 6 years old which agrees to our study that revealed that the age of 52.04% of child scorpion sting victims were between 0-6 years old.

The most frequency of applied medicines after using antivenin was alkaline diuresis. This treatment applied to alkali the urine as a medical approach against renal failure due to hemolysis effects of *H. lepturus* venom. However, studies of Farzanpay (1978) and Dehghani et al. (2009) have explained that there is another scorpion species that its venom causes hematuria and sever disorders in human. This is called *Compsobuthus matthiesseni* of Buthidae. The department emergency hospitals in south and south west of Iran take wrongly it with *H. lepturus*. The medical importance of *C. matthiesseni* should be separated from *H. lepturus* in the further similar studies. It is supposed that some of unknown species should be *Compsobuthus* sp, in the current study.

Finally, it is concluded that the scorpionism in Khuzestan is based on two species of *H. lepturus* and *A. crassicauda* stings. Therefore the most scorpionism emergencies among the children in Khuzestan should be paid to both species.

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