

# Epidemiological and Clinical Study of Scorpion Envenomation in Patients Admitted at Rims Teaching Hospital, Raichur

Rajashekhar<sup>1\*</sup>, Shankarappa M Mudgal<sup>2</sup>

<sup>1</sup>Associate Professor, Department of Medicine, Raichur Institute of Medical Sciences, Raichur, Karnataka, India, <sup>2</sup>Professor and Head, Department of Medicine, Raichur Institute of Medical Sciences, Raichur, Karnataka, India

## Abstract

**Objectives:** The objectives of the study were to describe both epidemiological and clinical manifestations following scorpion envenomation and to define simple predictive factors which can be used in routine clinical practice as an indicator of poor prognosis and to evolve preventing measures.

**Materials and Methods:** It was a retrospective descriptive study in which a total of 33 cases of scorpion envenomation who were admitted during the defined study period of 2009 to 2014 (5 years) were included in the study. The case records were collected, tabulated, and analyzed.

**Results:** About two-thirds of the cases were males (63.6%). Occupation of about half of the cases were coolies. More than half of the cases (57.5%) were from rural area. House was the most common place of bite (66.7%) followed by fields. In two-third of the cases, the bite was by black scorpion. Most of the cases presented with pain at the site of bite. Signs such as bradycardia, drowsiness and few cutaneous manifestations, hypotension and hypertension were observed. The patients were treated symptomatically and prazosin. The duration of stay varied from 1 to 5 days.

**Conclusion:** Scorpion sting was seen more in labor class people and also in students. And also in people living in rural area where there are problems of poor housing conditions. Administration of prazosin at an interval of 3 h prevents the development of complications and probably leads to rapid recovery.

**Key words:** Black scorpion, Prazocin, Symptoms, Red scorpion, Scorpion envenomation

## INTRODUCTION

Scorpion envenomation is a major public health problem in India. Scorpion envenomation causes significant morbidity and mortality remains high especially in rural areas due to delay in hospitalization due to prevailing superstitions and faith in village healers.<sup>1</sup> There are nearly 100 species of scorpion worldwide. Among 86 species present in India, *Mesobuthus tumulus* (Indian red scorpion) and *Heterometrus swammerdami* (black scorpion, formerly

palamneus) are of medical importance.<sup>2</sup> The scorpion venom is a water soluble, antigenic, complex mixture of neurotoxin, cardiotoxin, nephrotoxin, hemolysin, phosphodiesterases, phospholipases, hyaluronidases, histamine, and other chemicals.<sup>3</sup> Although local symptoms including severe pain and burning sensation at the site of sting are the most common symptoms, systemic manifestations can ensure. Cardiovascular complications are particularly prominent following stings by Indian red scorpion.<sup>4</sup> All these manifestations are due to autonomic storm, mixture of both cholinergic, and adrenergic manifestations.<sup>5</sup> Although adults are more frequently concerned, children experience more severe envenomations and mortality is higher among them. Improvement of therapeutic management would shrink the lethality very considerably.<sup>6</sup> Morbidity and mortality due to scorpion sting result from acute refractory pulmonary edema, cardiogenic shock, and multiorgan

### Access this article online



www.ijss-sn.com

Month of Submission : 04-2017  
Month of Peer Review : 05-2017  
Month of Acceptance : 06-2017  
Month of Publishing : 06-2017

**Corresponding Author:** Dr. Rajashekhar, Associate Professor, Department of Medicine, Raichur Institute of Medical Sciences, Raichur-584102, Karnataka, India. Phone: 9448831428. E-mail: rajashekharrims@gmail

failure.<sup>7</sup> Opinions vary about the right treatment for scorpion sting. In the past different regimens, including a lytic cocktail,<sup>8</sup> insulin,<sup>9</sup> atropine,  $\beta$  blocker, nifedipine,<sup>10</sup> and captopril<sup>11</sup> have failed to reduce morbidity and mortality, but since the advent of the  $\alpha_1$  blocker prazosin the fatality rate has been reduced to 1%.<sup>12,13</sup> Scorpion envenomation could be classified as mild, moderate, and severe, and the therapeutic approach was based on the case severity. The treatment of the patients comprised 3 components: Symptomatic treatment, supporting vital functions, and injection of antivenom. The time that elapsed amid the sting and administration of the correct medical care was extremely essential to the patient's prognosis.<sup>14</sup>

The objectives of the study were to describe both epidemiological and clinical manifestations following scorpion envenomation and to define simple predictive factors which can be used in routine clinical practice as an indicator of poor prognosis and to evolve preventing measures.

## MATERIALS AND METHODS

This study was conducted in Teaching hospital of Raichur Institute of Medical Sciences, Raichur. This is a retrospective descriptive study of the case records of the patients admitted with the history of scorpion envenomation. Approval from the Institutional Ethical Committee was obtained before conducting the study.

Records of all the patients irrespective of age, gender, and places who were admitted with the history of scorpion envenomation during the period of 1<sup>st</sup> January 2009 to 31<sup>st</sup> December 2014 (5 years) were included in the study. A total of 33 cases of scorpion envenomation were admitted during the defined study period of 2009 to 2014. All these were considered for the study.

The sociodemographic details such as name, age, gender, address, occupation, and the details about the scorpion envenomation such as time and place of bite, site of bite, history of first aid and the details of history, examination, and treatment were collected from the hospital records. The data were collected and were entered in excel sheet. The data were analyzed using SPSS version 20.0 (trial). Categorical outcomes were summarized by rates. Numerical outcomes were summarized by mean and standard deviation.

## RESULTS

The study was a retrospective descriptive study conducted in Teaching Hospital of Raichur Institute of Medical

Sciences, Raichur. A total of 33 cases were included in the study as that was the total number of admitted cases with the Scorpion sting during the study period.

The mean age of the study subjects was  $21 \pm 10.7$  years, and the range was 7-40 years. The majority of the patients were adults more than 18 years (69.7%).

A total number of males were 21 (63.6%) and there were 12 females (36.4%). Out of total 33 study participants, majority were coolies (48.5%), followed by students (39.4%), homemakers (6.1%), and farmers (6.1%). When the place of residence was classified, more than half of the patients were 57.6% were from the rural area and 42.4% were from the urban area (Table 1).

In the present study, the majority of the patients were envenomated in their houses (66.7%), followed by fields (27.3%) and 2 of them had the bite in school (6.1%). When categorized according to the time taken to take the patient to the hospital, only 2 (6.1%) of them reached hospital in <1 h and most of them reached after 1 h of bite (93.9%). In our study, 12 (36.4%) people were bitten on their arm, 10 (30.3%) on foot or toes and 5 (15.2%) on their hands or fingers. Two-thirds of the individuals were bitten by black scorpions and one-third by red scorpions. Pain at the site of sting was present in most of the patients (93.9%) followed by sweating (33.3%) and palpitation (27.3%) and only two individuals (6.1%) presented the symptoms of abdominal discomfort (Table 2).

The clinical examination findings and the treatment given were also collected and analyzed. Bradycardia was seen in 23 (69.7%) patients, hypotension in 10 (30.3%), and hypertension in 12 (36.4%) patients. Tachypnea was seen in 16 (42.4%) patients. No abnormality was found in systemic examination except two patients were found to be disoriented during nervous system examination. Investigations such as complete blood counts, urine routine, and electrocardiogram were found to be normal

**Table 1: Distribution of study participants according to socio-demographic profile**

Socio-demographic	N (%)
Gender	
Males	21 (63.6)
Females	12 (36.4)
Occupation	
Coolie	16 (48.5)
Farmer	2 (6.1)
Homemaker	2 (6.1)
Student	13 (39.4)
Address	
Rural	19 (57.6)
Urban	14 (42.4)

in all the cases. Mean duration of stay was  $2.1 \pm 1.44$  days. Range of stay was 1-5 days. Majority of the patients stayed in the hospital for 1 day (54.5%), followed by 5 patients (15.2%) for 2 days, 2 (6.1%) for 3 days, 5 (15.2%) for 4 days and 3 (9.1%) for 5 days (Table 3).

Cutaneous findings such as erythema, ulcer, necrosis, and ecchymosis in scorpion stung children were also recorded in this study.

We compared the time between the bite and time of reaching the hospital and duration of stay in the hospital

**Table 2: Distribution of study participants according to history and chief complaints**

History and chief complaints	N (%)
Place of bite	
House	22 (66.7)
Field	9 (27.3)
School	2 (6.1)
Time taken to reach hospital	
Less than 1 h	2 (6.1)
More than 1 h	31 (93.9)
Site of bite	
Foot/Toes	10 (30.3)
Leg	3 (9)
Hand/Fingers	5 (15.2)
Forearm	3 (9.1)
Arm	12 (36.4)
Type of Scorpion	
Black	22 (66.7)
Red	11 (33.3)
Symptoms	
Pain	31 (93.9)
Sweating	11 (33.3)
Palpitation	9 (27.3)
Abdominal symptoms	2 (6.1)

**Table 3: Distribution of study participants according to the examination and treatment**

Examination and treatment	N (%)
Pulse rate	
Bradycardia	23 (69.7)
Normal sinus rhythm	10 (30.3)
Blood pressure	
Hypotension	10 (30.3)
Normotension	11 (33.3)
Hypertension	12 (36.4)
Medications	
IV fluids	26 (78.8)
Pain management	21 (63.7)
Local anesthesia	15 (45.5)
Injection TT	16 (48.5)
Prazocin	28 (84.8)
Duration of stay (days)	
1	18 (54.5)
2	5 (15.2)
3	2 (6.1)
4	5 (15.2)
5	3 (9.1)

and it was found to statistically significant (Chi-square: 76.963,  $P < 0.0001$ ). The duration of stay in case of bite from a red scorpion was longer compared to bite of black scorpion and it was found to statistically significant (Chi-square: 9.6,  $P = 0.04$  or  $P < 0.05$ ). The duration of stay was longer in patients coming from the rural area than urban area and it was statistically significant (Chi-square: 18.262,  $P = 0.003$  or  $P < 0.005$ ). We also compared administration of Prazosin and duration of stay in the hospital, but statistical significance could not be established ( $P = 0.297$ ). Hypotension was seen more in patients  $< 18$  years old and it was found to statistically significant ( $P < 0.0001$ ).

## DISCUSSION

Scorpionism is a prevalent event in the tropical regions. Most of the patients were males (63.6%) and 36.4% were females. This rate is accordance with results of Dehghni *et al.* 2010.<sup>14</sup> Dehghni *et al.* in Kashan that they reported that the scorpion stung people were males (53.04%) than females (46.95%). However, it is not consistent with the results of Vaziriznzhadeh *et al.* (2008)<sup>15</sup> in Khuzestan who reported more number of females than males. It is due to different methods and geographical locations in the two studies.

The results of this study approved that only 42.4 % of scorpion stung people have been recorded in urban area which differs from the study done by Vaziriznzhadeh *et al.* which reported that the most of the patients who referred to Ahvaz hospitals regarding scorpion stings had been stung by scorpions in urban area.<sup>15</sup>

In a study done by Mahaba, the severity of symptoms and signs after scorpion stings are significantly more among infants than adults and the treatment seems to be more essential in children than in adults. The severity of signs among hospitalized children in this study agrees with the results of the above said study which mentions 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 venom.<sup>16</sup> Cutaneous findings such as erythema, ecchymosis, ulcer and necrosis among scorpion stung children, were also recorded in this study which is in agreement to the findings of Radmanesh.<sup>17</sup> The results of the current study are also in agreement with a study done by Pipelzadeh *et al.*,<sup>18</sup> which states that 41% of the bites occurred in the lower extremities.

In a study done by Bawaskar and Bawaskar, 619 patients with severe envenomation, hypertension was noted in 55%, pulmonary edema in 27% and hypotension in 18%; all

patients recovered with oral prazosin.<sup>19</sup> The results of our study are similar to this study except for the fact that, in the present study, we did find any case of pulmonary edema.

Since the antivenom is not supplied by the government, it was not used in the present study; however, several studies support the fact that antivenom is not must in every case of scorpion sting. Antivenom which is species specific is desirable to neutralize venom; however, prazosin, by correcting disturbed metabolism and antagonizing sympathetic over activity, is efficient against envenomation by several scorpion species.<sup>8</sup> Although the rapid recovery in patients treated with antivenom is an advantage, the total cost of treatment with antivenom approaches a month's salary for a laborer in the region.<sup>20</sup>

## CONCLUSION

Scorpion sting was seen more in labor class people and also in students. And also in people living in the rural area where there are problems of poor housing conditions, overcrowding and insanitary methods of waste disposal. Scorpion envenomation is classified into mild, moderate and severe. The therapeutic approach was based on the case severity. The treatment comprised 3 components: Symptomatic treatment such as pain management and local anesthetics, vital functions support, and administration of Prazosin. Moreover, the time that elapsed between the sting and administration of the appropriate medical care is extremely important to the patient's prognosis. Prazosin is a known antidote to *Mesobuthus tamulus* scorpion venom. Administration of prazosin at an interval of 3 h prevents the development of complications and probably led to rapid recovery.

## LIMITATIONS

Since the study is a retrospective descriptive study done in a hospital set up, only the patients who approached the hospital are considered in the study. Many of the people stung by scorpion go for local remedies since they are not aware of the complications of severe envenomation.

## REFERENCES

1. Munjal YP, Sharma SK. API Textbook of Medicine. 9<sup>th</sup> ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.; 2012. p. 1960-4.
2. Erfati P. Epidemiology, symptomatology and treatment of buthinae stings. In: Bettini S, editor. Arthropod Venoms, Handbook of Experimental Pharmacology. New York: Springer-Verlag; 1978. p. 312-5.
3. Bawaskar HS, Bawaskar PH. Scorpion sting. J Assoc Physicians India 1998;46:388-92.
4. Bawaskar HS, Bawaskar PH. Indian red scorpion envenoming. Indian J Pediatr 1998;65:383.
5. Zlotkin E, Miranda F, Lissitzky S. Proteins in scorpion venoms toxic to mammals and insects. Toxicon 1972;10:207-9.
6. Chippaux JP, Goyffon M. Epidemiology of scorpionism: A global appraisal. Acta Trop 2008;107:71-9.
7. Karnad DR. Haemodynamic pattern in patients with scorpion envenomation. Heart 1998;79:485-9.
8. Mahadevan S, Choudhury P, Puri RK, Srinivasan S. Scorpion envenomation and the role of lytic cocktail in its management. Indian J Pediatr 1981;48:757-61.
9. Murthy KR, Shenoi R, Vaidyanathan P, Kelkar K, Sharma N, Birewar N, et al. Insulin reverses haemodynamic changes and pulmonary oedema in children stung by the Indian red scorpion *Mesobuthus tamulus* concanensis, Pocock. Ann Trop Med Parasitol 1991;85:651-7.
10. Bawaskar HS, Bawaskar PH. Management of the cardiovascular manifestations of poisoning by the Indian red scorpion (*Mesobuthus tamulus*). Br Heart J 1992;68:478-80.
11. Karnad DR, Deo AM, Apte N, Lohe AS, Thatte S, Tilve GH. Captopril for correcting diuretic induced hypotension in pulmonary oedema after scorpion sting. BMJ 1989;298:1430-1.
12. Bawaskar HS, Bawaskar PH. Prazosin in management of cardiovascular manifestations of scorpion sting. Lancet 1986;1:510-1.
13. Al-Asmari AK, Al-Seif AA, Hassen MA, Abdulmaksood NA. Role of prazosin on cardiovascular manifestations and pulmonary edema following severe scorpion stings in Saudi Arabia. Saudi Med J 2008;29:299-302.
14. Dehghni R, Vazirianzadeh B, Nasrabadi MR, Moravvej SA. Study of scorpionism in Kashan in central of Iran. Pak J Med Sci 2010;26:955-8.
15. Vazirizadeh B, Hajihossieni R, Amiri B, Bagheri H. Epidemiological study of scorpionism in the hospitals of Ahvaz, SW Iran. Final Report of a Research Study in the Ahvaz Jundi Shapur University of Medical Sciences, Iran (Persian); 2008.
16. Mahaba HM. Scorpion sting syndrome: Epidemiology, clinical presentation and management of 2240 cases. East Mediterr Health J 1997;3:82-9.
17. Radmanesh M. Cutaneous manifestations of the *Hemiscorpius lepturus* sting: A clinical study. Int J Dermatol 1998;37:500-7.
18. Pipelzadeh MH, Jalali A, Taraz M, Pourabbas R, Zaremirakabadi A. An epidemiological and a clinical study on scorpionism by the Iranian scorpion *Hemiscorpius lepturus*. Toxicon 2007;50:984-92.
19. Bawaskar HS, Bawaskar PH. Envenoming by scorpions and snakes (*Elapidae*), their neurotoxins and therapeutics. Trop Doct 2000;30:23-5.
20. Bawaskar HS, Bawaskar PH. Efficacy and safety of scorpion antivenom plus prazosin compared with prazosin alone for venomous scorpion (*Mesobuthus tamulus*) sting: Randomised open label clinical trial. BMJ 2011;342:c7136.

**How to cite this article:** Rajashekhar, Mudgal SM. Epidemiological and Clinical Study of Scorpion Envenomation in Patients Admitted at Rims Teaching Hospital, Raichur. Int J Sci Stud 2017;5(3):73-76.

**Source of Support:** Nil, **Conflict of Interest:** None declared.