

Clinical profile and outcome of scorpion sting envenomation in children at a tertiary care centre in South India

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ABSTRACT

Background: Clinical manifestations from scorpion sting envenomation ranges from mild local pain to systemic manifestation involving multiple systems. With recent protocol guided management the mortality has reduced to as low as 1% from 30% in earlier days. **Objectives:** The objectives of the study were to study the clinical profile and outcome of scorpion sting envenomation in children. **Methodology:** This prospective, observational study was conducted in tertiary care centre of South India over 1 year. On admission, detailed history and clinical examination were done and recorded. The children were graded according to the type of symptoms and signs present and managed accordingly. Statistical analysis was done using SPSS 16.0. **Results:** Our study included 97 children, of which children aged 1–3 years contributed to the maximum cases (47%). Male children (54.6%) were affected more than female (45.4%). Majority of the cases were from a rural area (67%). Red scorpion stings (59%) were more common, and 63% of the stings occurred in the night time. Lower limbs (54%) were the common site of sting. The most common symptom was pain (93%), and the least common was convulsion. The most common presentation was with autonomic symptoms (Grade 2–33%). The most common electrocardiogram finding was tachycardia (74%). Of the total 97 cases, 5 cases had severe pulmonary edema and required ventilator support, and all 5 cases expired. Complications like pulmonary edema were less when children received the first dose of prazosin within 6 h. **Conclusion:** Early hospitalization, early administration of prazosin, monitoring of vitals, management of complications, and good supportive care may reduce the morbidity and mortality due to scorpion envenomation.

Key words: Prazosin, Red scorpion, Scorpion sting

Scorpion sting envenomation is an acute life-threatening medical emergency in children [1,2]. The effect of envenomation is greatest among children <5 years of age. Only 86 species of scorpions among 1500 identified species worldwide are found in India [3,4]. Children are more prone to severe envenomation because of the explorative nature, higher venom to body surface area, reduced withdrawal response, so that scorpion injects more venom into the site. In India, only two species, *Mesobuthus* (red) and *Palamnaeus* (black), are poisonous. Presentation from scorpion sting envenomation includes a wide variety of features from pain at the local site to systemic manifestation involving almost all systems, more commonly cardiovascular and may sometimes lead to mortality [5,6]. Direct or indirect stimulation of the autonomic nervous system by scorpion envenomation results in various autonomic system disturbances. Of which most important is autonomic storm [6,7].

Before the pre-prazosin era, mortality due to scorpion envenomation was 30%. However, the use of alpha-blockers and protocol guided management has reduced the mortality to as low as 1%. We share our experience from a tertiary care medical college hospital with this study. The objective is to study the

clinical profile and outcome of scorpion sting envenomation in children admitted to a tertiary care centre, South India.

METHODOLOGY

This prospective observational study was conducted in a tertiary care centre in South India over a period of 1 year (January 2014–December 2014). Prior approval from the Institutional Ethics Committee was obtained, and consent was taken from the parents/legal guardians before recruitment. All patients <12 years of age admitted with scorpion sting envenomation during the study period were included in the study. Children >12 years of age and children admitted with a history of unknown bite with clinical features not suggestive of scorpion sting envenomation were excluded from the study.

On admission, detailed history, clinical examination, type of scorpion sting, time of bite, first aid taken before admission, and symptoms at the time of admission were recorded. The children were graded according to the type of symptoms and signs present and managed accordingly. Careful monitoring of the patient was done to look for the progress and development of the complications. Pulse, blood pressure, respiratory rate, and SP_{O_2}

were monitored for every 30 min for the first 3 h then hourly for 6 h until extremities were warm and dry. Management details were noted down, and outcomes were also analyzed. According to the signs and symptoms, patients were graded [8] as:

1. Grade 1: Local Pain only
2. Grade 2: Transient Hypertension, Normotension, Vomiting, Excessive salivation, Sweating, Priapism, and Miosis
3. Grade 3: A - Hypertension, B - Hypotension with Tachycardia, C - Myocarditis, D - Pulmonary Edema, E - Encephalopathy
4. Grade 4: 2 or more of Grade 3 signs.

Statistical analysis was done using SPSS 16.0

RESULTS

A total of 97 children were included in our study. Children in the age group of 1–3 years contributed to the maximum number of cases (47%). Male children (54.6%) were affected more than female children (45.4%) in our study. Majority of the cases were from a rural area (67%). Red scorpion sting (*Mesobuthus*) (59%) was more common than the black scorpion (*Palamneus*) (41%) sting envenomation. 63% of the stings occurred in the 9 time. In our study, lower limbs (54%) were the common site of sting. Maximum number of cases was reported during July–August. Table 1 show the clinical profile of scorpion sting children.

In our study, the first dose of prazosin was administered within 6 h in 26% cases and 8% cases received first dose of prazosin after 19 h of the sting. The most common presenting symptom was pain (93%), followed by sweating and cold peripheries. The least common presentation was convulsion which was present only in one case. The most common presentation of grade was with features of the autonomic storm (Grade 2) in 33% cases followed by Grade 1 with local symptoms. The most common sign was peripheral circulatory failure (60%), followed by tachycardia; the least common presentation was with encephalopathy. The mortality rate of our study was 5.2% (5 cases expired).

Of the total 97 cases, 5 cases had severe pulmonary edema and required ventilator support immediately. 3 of them expired within 6 h of admission, 4th expired at 11 h, and the 5th one expired at 16 h of admission. 34% of cases had a reversal of autonomic symptoms within 6 h. The remaining cases had a reversal of autonomic storm from 6 h (17%) to 48 h (5%) and found to be significant ($p=0.001$). The most common electrocardiogram finding was tachycardia; evident in 71 cases (74%) followed by ST-T wave changes in 16% cases, and bradycardia in 2% of the cases. Of the 28 cases for whom ECHO was done, 13 cases showed diminished left ventricular ejection fraction, 2 cases showed mitral regurgitation, and 1 case showed global hypokinesia. Positive lab findings included leukocytosis which was seen in 10% of the cases. Hyperglycemia was present in 1 case.

67% of cases received prazosin, while 5% of cases needed mechanical ventilation. Complications like pulmonary edema were less when children received the first dose of prazosin within 6 h when compared to those children who received the prazosin more than 6 h and found to be significant ($p=0.001$).

Table 1: Clinical profile of children admitted with scorpion sting

Characteristics	n (%)
Age	
1 month–1 year	4 (4.1)
1 year–3 years	46 (47)
3 years–6 years	13 (13.4)
6 years–9 years	22 (22.6)
9 years–12 years	12 (12.3)
Gender	
Male	53 (54.6)
Female	44 (45.4)
Residence	
Rural	65 (67)
Urban	32 (33)
Type of scorpion	
Black	39 (41)
Red	58 (59)
Time of sting	
Day	34 (35)
Night	63 (65)
Site of sting	
Face and scalp	1 (1)
Trunk	15 (15)
Upper limb	28 (29)
Lower limb	53 (54)
Sting prazosin time interval (h)	
<6	25 (26)
6–10	35 (36)
11–14	16 (17)
14–18	13 (13)
19 h and above	8 (8)
Presenting symptom	
Pain	90 (93)
Cold peripheries	87 (89)
Restlessness	83 (85)
Sweating	86 (89)
Vomiting	61 (63)
Swelling	15 (15)
Piloerection	41 (42)
Altered sensorium	13 (13)
Convulsion	1 (1)
Grade of signs and symptoms	
Grade 1	24 (25)
Grade 2	32 (33)
Grade 3A	2 (2)
Grade 3B	12 (12)
Grade 3C	16 (17)
Grade 3D	5 (5)
Grade 3E	1 (1)
Grade 4	5 (5)
Physical signs	
Peripheral circulatory failure	44 (60)
Priapism	41 (42)

(Contd...)

Table 1: (Continued)

Characteristics	n (%)
Tachycardia	71 (97)
Bradycardia	2 (3)
Hypertension	2 (3)
Hypotension	12 (16)
Myocarditis	16 (21)
Pulmonary edema	5 (7)
Encephalopathy	1 (1)
Time taken for reversal of an autonomic storm	
Normal	24 (25)
0–6 h	33 (34)
6–10 h	16 (17)
10–14 h	10 (10)
15–24 h	4 (4)
24–48 h	5 (5)
Total	92 (95)
Outcome	
Recovered	92 (95)
Expired	5 (5)

DISCUSSION

Scorpion sting envenomation is one of the common medical emergencies; especially, in children. In our study, a maximum number of scorpion sting has been reported among children aged 0–3 years. Osnaya-Romero *et al.* [9] reported more cases among infants from 1 to 3 years and the average age was 5.2 years which were similar to our study. A male predominance was observed in our study which was similar to the results of a study by Pol *et al.* [10]. This male predominance was because of the higher explorative nature of boys. The scorpion stings due to red scorpions were more common than black scorpion species (59% vs. 41%). This result was consistent with the previous study by Pol *et al.* [10] with the incidence of 72%.

There was a higher incidence of scorpion sting in rural areas in our study. This may be attributed to poor socioeconomic status (children walking barefoot). Majority of the sting occurred during night time. This might be because of scorpions are active at night. In the majority of the children, the site of scorpion sting was lower limbs in our study, which was similar to the results of studies conducted by Pol *et al.* [10], Bosnak *et al.*, [11] and Farghly and Ali [12]. Sting-prazosin interval was less in our study when compared to other studies [1,13] attributed to the increased awareness of scorpion sting among the general public and healthcare workers.

The most common presenting symptom was pain (93%) followed by cold peripheries, sweating, and restlessness. Convulsion was the least common presentation in our study. Tachycardia was the most common sign encountered followed by peripheral circulatory failure. In our study, most of the cases were classified as Grade 2 and complications were noted more frequently in younger children

and in cases who received the first dose of prazosin after 8 h of the sting. This was comparable to other studies [14,15]. Mortality rate in our study was 5%, and all cases had pulmonary edema which is similar to study conducted by Soren and Rao [16].

CONCLUSION

Scorpion sting envenomation is a preventable life-threatening emergency among children. Supervised outdoor play, early hospitalization, early administration of prazosin, close monitoring of vitals and management of complications, and good supportive care may reduce the morbidity and mortality due to scorpion envenomation. Education of healthcare workers regarding scorpion sting and the importance of early prazosin administration may also be helpful in reducing mortalities.

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