

Clinico-Epidemiological Profile of Scorpion Sting in a Tertiary Care Centre in South Tamil Nadu

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ABSTRACT

Introduction: Venomous scorpion sting is a medical emergency. The clinical manifestations vary widely between the children and adult group. Current research aimed to study the epidemiological profile of Scorpion Stings and to study the clinical profile and prevalence of complications of Scorpion stings.

Material and methods: 82 cases of Scorpion sting admitted in Toxicology unit of Tirunelveli Medical College were studied. Detailed history was taken, and a thorough clinical examination was done in all patients. All patients were given Prazosin except in cases with hypotension.

Results: Scorpion sting was more common in monsoon followed by Summer season. The sting was more prevalent in the lower limb. Commonest symptom was pain followed by numbness and tingling. Dyspnea and perspiration were less common. 60.9% had grade I envenomation followed by 25.7% patients with grade 2 envenomation. Severe envenomation was less common. Tachycardia was frequently noted (62.2%) whereas only 3 patients developed pulmonary edema. All patients recovered well, and there was nil mortality.

Conclusion: Prazosin had good outcome in all patients with scorpion sting. The study throws light on the common clinical features and complications of scorpion sting.

Keywords: Scorpion Sting, Myocarditis, Pulmonary Edema, Prazosin, Scorpion Antivenom.

INTRODUCTION

Scorpion sting is an acute life threatening condition. Scorpions are found in dry and hot environments. All species are nocturnal. There are more than 1500 species of scorpions; about 100 species are found in India. Two species- *Mesobuthus tamulus* – the red scorpion (Fig.1) and *Palmaneous gravimanus* (Fig.2) -the black scorpion (Nattuvakaali in Tamil) are important medically.¹ The venom is a clear, colourless toxalbumen. The venom is haemolytic or neurotoxic. Its toxicity is more than that of snakes, but only a small quantity is injected. The venom vesicle is surrounded by a striated muscular layer which regulates the ejection of venom; thus the sting can be complete, partial or dry. The Venom also contains enzymes like hyaluronidase, phospholipase; histamine and serotonin. The stimulation of autonomic nervous system results in initial bradycardia followed by tachycardia. Also there is initial hypotension due to cholinergic effect followed by prolonged hypertension. Hypertension is due to massive outpouring of catecholamines from adrenal medulla and from post ganglionic neurons. Pulmonary edema is mostly toxin induced but can be secondary to myocarditis also.²

Though Scorpion stings are commonly encountered, toxic stings are less common. There are many studies in the pediatric age group whereas only a few studies are available in the adult group. Hence we, intended to study the clinical and epidemiological profile of Scorpion sting.

Current research aimed to study the epidemiological profile of Scorpion Stings and to study the clinical profile and prevalence of complications of Scorpion stings.

MATERIAL AND METHODS

The study was done in toxicology section of intensive medical care unit in Tirunelveli Medical College Hospital. Adults and adolescents with history of Scorpion sting from age 13 years were included in the study. 82 cases of Scorpion sting admitted from December 2017 to November 2018 were included in the study. On admission, a detailed history, time of sting, clinical symptoms and signs were recorded. Details regarding the type of Scorpion and situation leading up to the sting were noted. It is a retrospective observational study and approval was obtained from the Institutional Ethics Committee. Known cases of liver disease, kidney disease and ischemic heart disease patients were excluded from the study. All patients were clinically examined thoroughly with careful monitoring of heart rate, respiratory rate, blood pressure, cardiovascular, respiratory and neurological findings were noted. Elaborate investigations were done: including complete blood counts, peripheral smear, blood sugar, urea, creatinine. Liver function tests were done for cases. Serum Amylase and Creatinine kinase estimation were done for deserving cases. Electrocardiography was done in all cases at the time of admission. Chest X-ray and electrocardiography was done in cases with myocarditis and pulmonary edema.

The patients were graded according to the severity of envenomation.²

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Grade I

Severe excruciating local pain at the sting site retaining along the dermatome, mild local edema, without systemic involvement.

Grade II

Signs and symptoms of autonomic storm.(Parasympathetic and sympathetic stimulation)

Grade III

Cold extremities, tachycardia, hypotension or hypertension with pulmonary edema.(Respiratory rate > 24 per minute, basal rals)

Grade IV

Tachycardia, hypotension with or without pulmonary edema with warm extremities(Warm shock), altered consciousness. All patients with symptoms and signs envenomation were given Tab. Prazosin at a dose of 30 microgram /kg/dose at admission and repeated every four hours and titrated targeting warm peripheries and adequate urine output. Myocarditis was treated with Prazosin, Dobutamine infusion and nitroglycerine infusion. Pulmonary edema was treated with furosemide and mechanical ventilation. Morphine is avoided in the setting of Scorpion sting with pulmonary edema because it prevents reuptake of noradrenaline and potentiates sympathetic symptoms.

RESULTS

Out of 82 cases, the age group that was most involved was between 31 and 40 years followed by 21-30 years age group. Scorpion sting was more common in females(44%)

(Table1) Scorpion stings were more common in monsoon season (42.7%) followed by summer season (32.9%) (Table2). Stings due to Red Scorpion was more common (57%) than stings due to Black Scorpion. Most bites were in the lower extremities (48.78%) compared to the upper extremities. Stings during the day time were more common (68%). The findings further revealed that pain was the most common symptom and was present in all cases. Numbness or tingling was present in 50 cases (60.98%). 8 cases(9.76%) had perspiration, 9 cases (10.98%) had dyspnea and 18

S. No.	Age (years)	Male	Female	Total
1	13-20	4	3	7
2	21-30	9	13	22
3	31-40	12	17	29
4	41-50	6	5	11
5	51-60	4	6	10
6	>60	1	2	3
Total		36	46	82

Table-1: Age wise and Sex wise distribution of cases

S.No.	Season	No.of cases	Percent %
1	Summer	27	32.9
2	Monsoon	35	42.7
3	Winter	12	14.6
4	Spring	8	9.8
Total		82	

Table-2: Seasonal Distribution of Scorpion Sting cases

S. No.	Description	No. of Cases	Percent %
1	Pain at site of Sling	82	100
2	Numbness/Tingling	50	60.98
3	Vomiting	10	12.20
4	Perspiration	8	9.76
5	Dyspnea	9	10.98
6	Cold extremities	18	21.95

Table-3: Clinical profile of Scorpion envenomation

S.No.	Severity	No. of Cases	Percent %
1	Grade 1	50	60.9
2	Grade 2	21	25.7
3	Grade 3	7	8.53
4	Grade 4	4	4.9
Total		82	

Table-4: Prevalence of various grades of envenomation

S.No.	Complications	No.of cases	Percent %
1	Tachycardia	51	62.2
2	Hypotension	6	7.32
3	Hypertension	24	29.27
4	Peripheral Circulatory failure	3	3.66
5	Myocarditis	10	12.2
6	Altered mentation	2	2.44
7	Pulmonary edema	3	3.66

Table-5: Prevalence of complications of Scorpion envenomation

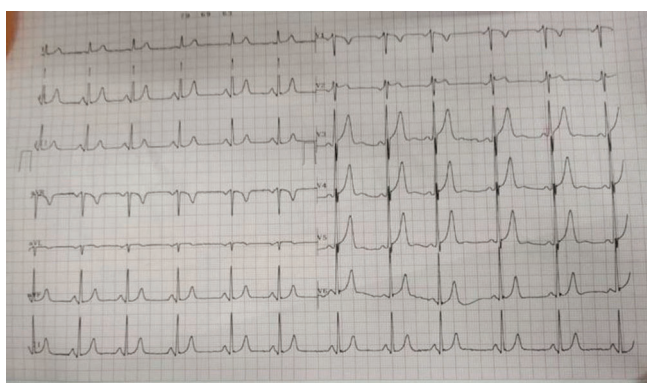


Figure-1: ECG showing tall 'T' waves indicating envenomation

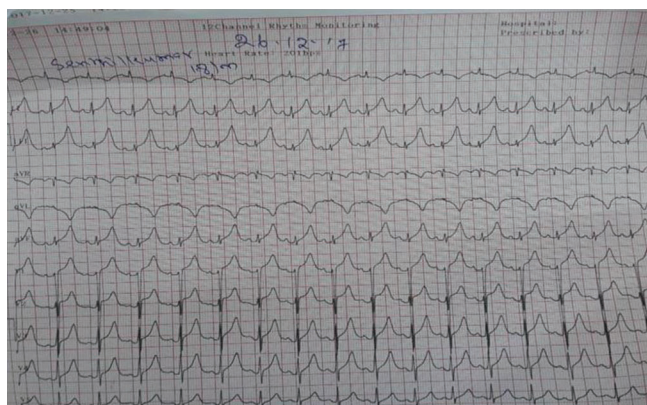


Figure-2: ECG showing myocarditis

cases(21.95%) had cold extremities(Table3). Upto 61% of cases had grade1 or local envenomation (Table4). Only 4.9% of cases severe grade4 envenomation (Table4). Tachycardia was the most prevalent complication noted in 62.2% cases. 24 cases (29.27%) developed hypertension which was more common than hypotension (7.32%). Peripheral circulatory failure was noted only in 3 cases (3.66%). Altered mentation and pulmonary edema were also less common(Table5).There was no mortality in our study. All the 82 cases recovered well and discharged in good condition.

Hypertension was seen in 29.27% cases and only 6% cases developed hypotension.ECG changes were noted in most cases of scorpion sting. The most common finding noted was sinus tachycardia.ST,T changes noted were peaked tall T waves which settled after treating with tablet prazosin. 10 cases had myocarditis and corresponding ECG changes (fig-1). Only 3 cases had peripheral circulatory failure and 3 cases developed pulmonary Edelman.

DISCUSSION

There was female preponderance in the study. More cases were noted in summer and monsoon.Stings were common in middle aged adults. Stings due to Red Scorpion was more common than Black Scorpion. Stings were common in extremities. Findings were similar to study by, Ahmed Z M, Singhal et.al., and a study by Reddy and Somaiah.^{3,4,5}

RST segment and T waves are most frequently affected. Arrowhead T wave look like Ashoka tree indicates acute injury(Fig.1), while tent shaped T wave looking like Christmas tree indicates recovery.Electrocardiographic changes were noted in most of the cases with systemic envenomation. Most cases had sinus tachycardia. Presence of peaked T waves correlated well with systemic envenomation. Other changes noted were ST segment depression and T wave inversions.It was also followed up that, after setting of signs of envenomation with administration of Prazosin, the peaked T waves were replaced by normal T waves.Early myocardial infarction like pattern, atrial arrhythmia, non – sustained ventricular tachycardia and conduction defects are also described. Toxins act by binding to Na⁺ channels.^{2,6,7}

Analysing the clinical profile of patients, all patients arrived due to pain at the site of sting, parasthesia was present in 60.98% of cases. Pain is the commonest symptom as reported by Agarwal R et. al., which was noted in our study also.⁸ Vomiting, sweating, salivation, priapism are diagnostic cardiac premonitory signs and symptoms of free circulating venom in the blood.⁹ Cold extremities were noted in 21.95% cases. According to Bawaskar, hypertension was noted in 45-70% victims who reported within 8 hours. But in our study hypertension was less prevalent.² Intense perspiration is described by Bawaskar as “Skin diarrhea”.¹⁰

60.9% cases had Grade I envenomation i.e., only pain paraesthesia and swelling,34.14% had Grade II envenomation.24.39% had Grade III toxicity. Only 5 cases (6.09%) had fatal complications and revived. There was no mortality in the present study.92.68% cases were given

Prazosin at a dose of 30µg/ kg/ dose except in those with hypotension which had resulted in the favourable outcome.3 persons developed pulmonary edema and only 10 persons had features of myocarditis and all these could be attributed to early administration of Prazosin. ECG changes were noted showing myocarditis (Fig.1,2). 2 cases of pulmonary edema required mechanical ventilation. Both cases recovered well. Prazosin is a phosphodiesterase inhibitor and alpha receptor blocker; it reduces the preload and left ventricular impedance without raising heart rate.¹¹ Prazosin is a simple, scientific pharmacological and physiological antidote to scorpion venom.² Scorpion antivenom to red scorpion was used in general hospital, Mahad which concluded that patients in the antivenom plus Prazosin group required significantly fewer doses of Prazosin than Prazosin group.^{2,12}

CONCLUSION

- The study has described in detail about the clinical and epidemiological profile of Scorpion envenomation.
- The study has shown that early administration of Prazosin has reduced morbidity due to Scorpion sting.

Unfortunately Scorpion antivenom is not widely available in India. Early Prazosin, anticipation and close monitoring of complications are critical in the management of Scorpion sting.

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