

CLINICAL PROFILE AND OUTCOME OF SCORPION STING IN CHILDREN BETWEEN 1–12 YEARS OF AGE ADMITTED IN A TERTIARY CARE HOSPITALD. Saminathan¹, A. Thangavel², K. Balaji³, Harshitha C. Mouli⁴**HOW TO CITE THIS ARTICLE:**

D. Saminathan, A. Thangavel, K. Balaji, Harshitha C. Mouli. "Clinical Profile and Outcome of Scorpion Sting in Children Between 1–12 Years of Age Admitted in a Tertiary Care Hospital". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 44, June 01; Page: 7597-7603, DOI: 10.14260/jemds/2015/1103

ABSTRACT: AIM OF STUDY: To study the clinical presentation, course, complications and outcome of scorpion sting envenomation. To establish the usefulness of prazosin therapy and to emphasize that shorter the sting-prazosin interval, better the outcome. **DESIGN:** Observational. **SETTING:** Tertiary Care Hospital in Trichy, Tamilnadu. **PARTICIPANTS:** 60 children aged 1 to 12 yrs., with Scorpion envenomation. **MATERIALS AND METHODS:** Prospective study of 60 children with Scorpion sting admitted at Mahatma Gandhi Memorial Government Hospital, Trichy from July 2013 to August 2014. The severity of Scorpion sting was graded on admission into three (3) categories and the outcome evaluated. **RESULTS:** 66.66% of children were admitted with autonomic storm. Majority of children 43.33% had Grade II severity. 48.33% received 1st dose prazosin within 4 hours of sting, 45% received prazosin between 4-8 hrs. 6.66% of children received 1st dose of prazosin after 10 hours of sting due to delayed referral. The mean time of reversal of autonomic storm was between 6-24 hrs. **CONCLUSION:** The present study emphasizes the beneficial effects of Prazosin therapy in scorpion envenomation. The time lapse between sting and administration of prazosin greatly influences the outcome of these children.

KEYWORDS: Scorpion sting, Prazosin therapy, sting prazosin interval, reversal of autonomic storm.

AIM OF STUDY:

1. To study the clinical presentation, course, complications and outcome of scorpion sting envenomation.
2. To establish the usefulness of prazosin therapy and emphasize that shorter the sting- prazosin interval, better the outcome.

INTRODUCTION: More than one million children of scorpion envenomation are reported every year worldwide. Although the resultant mortality is lower than that from snake envenomation, there is substantial morbidity and that too among children with a risk of death.

Arthropods form a significant proportion of this hostile world. Scorpions are the oldest arachnids for which fossils are known. They are reputed to be the first land animals. Scorpions have changed very little through evolution and hence are called "living fossils". Out of 1500 species of scorpions that exist, about 30 are of medical importance.^{1,2} Though there are various species of scorpions, not all are found in all geographic location. Despite of this difference there is no difference in symptomatology following envenomation.

Scorpion live in hot dry environment throughout India and are nocturnal inhabitants of crevices of dwellings, coconut plantations, underground burrows, paddy, sugarcane fields, etc., with predilection in region with abundant red soil.

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Scorpion sting is an acute life threatening emergency encountered and most important rural health accident in India. Children are the predominant victims of the fatal sting.

Mesobuthus tamulus is the most lethal of all scorpion species³ and are found abundantly in Western Maharashtra, Andhra Pradesh.

MATERIAL AND METHODS: This Prospective Observational study was undertaken at Department of Pediatrics, Mahatma Gandhi Memorial Government Hospital attached to K.A.P. Viswanathan Government Medical College, Puthur, Trichy as this Pediatric ward caters to the health needs of children up to twelve years of age referred from the city of Trichy and its five neighboring districts.

STUDY POPULATION: All children aged between 1 to 12 years admitted to Mahatma Gandhi Memorial Government hospital, Trichy.

Inclusion Criteria:

1. History of scorpion sting.
2. Clinically suspected children of scorpion sting.

Exclusion Criteria:

1. Other animal/insect bites.
2. Scorpion sting in patients <1 year and >12 years.
3. Children without definite history of scorpion sting or clinical features of scorpion sting.

The study protocol was approved by Institutional research Committee including ethical clearance. The study procedure was fully explained to the Parents and written consent was obtained from the primary care giver. The children of those parents who did not give consent to undergo the study were excluded from the study subject.

STUDY DESIGN: 60 children of scorpion sting, admitted to Mahatma Gandhi Memorial Government Hospital, Trichy from July 2013 to August 2014 were included in the study after obtaining an informed consent from the parents. On admission a detailed clinical history, including the time of sting, symptomatology, details of treatment received before admissions were taken. Further a description of the scorpion and details about the circumstances leading to the sting were obtained.

All the patients were subjected to a detailed clinical examination at admission and at frequent intervals thereafter, as was necessary in each case. Hourly monitoring of heart rate, respiratory rate, blood pressure, urine output, cardiovascular and respiratory status was done. Age dependent heart rate, respiratory rate, blood pressure and liver span were defined as per PALS guidelines.

Routine investigations like complete blood counts, urine routine, serum electrolytes, blood sugar, renal functions tests and serum CPK levels, were done in all the children. Chest radiograph was done in suspected children with evidence of myocarditis or pulmonary edema. Electrocardiography (ECG) and Echocardiography were done in children with cardiac complications.

The severity of scorpion sting in children was graded.⁴

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Grade I	Grade II	Grade III
Local effects	Systemic effects	Life threatening
Isolated pain	Hypertension	Cardiogenic shock
	Sweating	Pulmonary edema
	Vomiting	Altered consciousness.
	Priapism	Encephalopathy
	Fever	
	Shivering	

All patients who were symptomatic received a dose of prazosin (30ug/kg), at admission. Children with peripheral circulatory failure were treated with prazosin in supine position, intravenous fluids and BP was closely monitored. Prazosin was given at admission, 2nd dose after 3 hours and then after every 6 hours up to a maximum of 4 doses, or till peripheries became warm and urine output improved.

Myocarditis was diagnosed on the basis of clinical features like tachycardia, gallop rhythm, arrhythmias, systolic murmur, ECG changes, elevated CPK and echocardiography. Acute pulmonary edema was diagnosed on the basis of clinical features like tachypnoea, pink frothy sputum, impaired percussion note over lung fields, crepitations, severe respiratory distress and radiological findings.

Congestive cardiac failure was diagnosed based on tachycardia, tachypnoea, hypotension, enlarged liver span.

Subsequent management was based on the development of complications and proctolised treatment followed in our institution. All the children were observed for a minimum period of 24 hours. Children with complications were discharged after drug free period of 12 hours and when stable for 24 hours.

RESULTS: During the study period of one year, 60 children aged 1yr to 12 yrs were admitted in our hospital with history of definite scorpion sting, 25 children (42%) belong to the age group of 1-3 yrs, 21 children (34 %) 4-6 yrs, 7 children (12%) 7-9 yrs and 7 children (12%) 10 to 12 yrs. Stings were more common in children from rural areas, in outdoor circumstances and with male preponderance.

CHARACTERISTICS	O (%)	CHARACTERISTICS	NO. (%)
Definite Scorpion sting	60	SEVERITY	
SITE OF STING		Grade I	18(30)
Upper Limb	14(23.33)	Grade II	26(43.33)
Lower Limb	31(51.66)	Grade III	16(26.66)
Trunk	7(11.66)	STING - PRAZOSIN INTERVAL	
Face & Scalp	8(13.33)	< 4 hr	29(48.33)
PRESENTING SYMPTOM		4-8 hr	27(45)
Pain at site of sting	50(83.13)	9-13 hr	4(6.66)
Salivation	39(65)	TIME OF REVERSAL OF AUTONOMIC STORM	

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Diaphoresis	41(68.33)	< 6 hr	5(8.33)
Vomiting	14(23.33)	7-10 hr	21
Swelling	6(10)	11 - 14 hr	1(1.66)
Dyspnoea	3(5)	15-18 hr	2(3.33)
SIGNS		19-22 hr	6(10)
Restlessness	11(18.33)	>22 hr	2(3.33)
Cold extremities	37(61.66)	IMAGING	
Tachycardia	23(38.33)	ECG changes	14(23.33)
Tachypnoea	10(16.66)	Echo	5(8.33)
Hypotension	7(11.66)	Chest X-ray	1(1.66)
Priapism	12(20)		

Table 1: Baseline characteristics in study

51.66 % had sting in lower limb. Pain at the site of sting (83.33%), diaphoresis (68.33%) and salivation (65%) were the symptoms. 66.66% of children were admitted with autonomic storm. Autonomic storm characterized by cold extremities (61.66%), tachycardia (38.33%), hypotension (11.66%) and Priapism were noted (20%). 3% of children presented with encephalopathy. 48.33% received 1st dose prazosin within 4 hours of sting. Majority of children 43.33% had Grade II severity. 6.66% of children received 1st dose of prazosin after 10 hours of sting due to delayed referral. The mean time of reversal of autonomic storm was between 6-24 hrs. ECG changes was noted in 23.3% children, with sinus tachycardia (50%) being the commonest finding. 10% had ST-T wave changes. 8.3% children showed echo changes like Left Ventricular dilatation and decreased left ventricular ejection fraction.

Complication	<4 hrs	4-8 hrs	9-13 hrs	P Value
Peripheral circulatory failure	11(38)	26(96)	4(100)	< 0.001
myocarditis	0	4(15)	4(100)	< 0.001
CCF	0	1(4)	2(50)	<0.001
Pulmonary edema	0	1(4)	3(75)	<0.001
encephalopathy	0	2(7)	0	0.282
ptosis	0	2(7)	0	0.282

Table 2: Sting-Prazosin Interval and Complication

Majority of Children who presented after 8 hours had complications like Myocarditis, CCF and Pulmonary edema in addition to Peripheral circulatory failure while children who presented between 4-8 hrs had predominantly peripheral circulatory failure. Children who presented within 4 hrs had peripheral circulatory failure less frequently.

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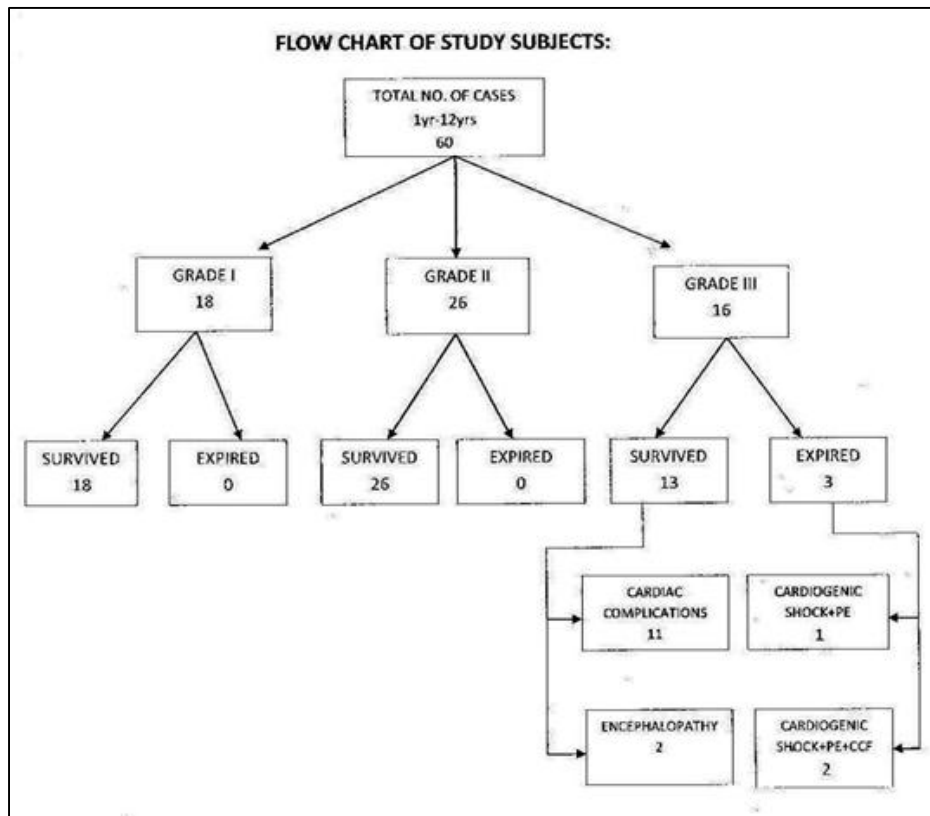
Complication	Grade I	Grade II	Grade III	P Value
Peripheral circulatory failure	0	26(100)	50(94)	<0.001
myocarditis	0	0	8(50)	<0.001
Cardiogenic shock	0	0	14(88)	< 0.001
CCF	0	0	3(19)	<0.013
Pulmonary edema	0	0	4(25)	<0.003
encephalopathy	0	0	2(13)	<0.058
Ptosis	0	0	2(13)	<0.058

Table 3: Severity and Complications

Complications like Peripheral circulatory failure, Myocarditis, Cardiogenic shock, CCF and pulmonary edema were noted frequently in children with Grade III envenomation.

Sting admission interval	No. of Patients	Outcome recovered	Outcome expired	%
< 4hr	29	29	-	48%
4-8 hrs	27	27	-	45%
9-13 hrs	4	1	3	7%

Table 4: Sting Admission Interval And Outcome



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Those children referred late had more complications and poor outcome. Three children who were referred late after 8 hours died within few hours of treatment due to massive pulmonary edema.

DISCUSSION: Scorpion sting is an acute life endangering pediatric rural emergency. Numerous envenomation go unreported and the true incidence is not known. Dominant clinical effects vary from species to species and from one geographical location to another. Case fatality rates vary widely among different regions from 3–22%,¹ and over the years, with improvement in management protocols, there has been a dramatic reduction in mortality.

The proportion of cases in the 1–3 years, 4–6 years, 7–9 years and beyond 10 years age groups were 42%, 34%, 12% and 12% respectively. Young children aged less than 6 years are more exploratory hence are more susceptible to stings. There was a male preponderance in the cases studied by us. This has also been noted in the past by various authors. Scorpion stings, much like snake bites are occupational hazards for the rural population.

A higher incidence of sting was noted in lower socio economic groups. The high incidence of stings in this group, is probably due to the type of housing and to their predominantly agricultural presents.

Outdoor stings are more common than indoor stings in all parts of the world. However we noted a significant number of indoor stings especially in the urban areas and in females. This should be considered when suggesting appropriate measures for prevention of scorpion stings.

The present study demonstrates beneficial effects of prazosin therapy and emphasizes that shorter the sting prazosin interval,^{1,4} better is the outcome. The time lapse between the sting and administration of prazosin determines the time of reversal of autonomic storm. In our study lesser the sting prazosin,^{4,5} interval shorter was the reversal time. Life threatening complications were encountered due to late referral and delayed administration of prazosin. Complications⁶ were more frequently noted in young children, red scorpion sting, sting-prazosin interval > 8 hr and Grade III envenomation. Majority of children recovered without any sequelae. Mean duration of hospital stay being 2-6 days according to the grade of severity.

In India, cardiovascular complications are most common and life threatening. However, anticipation and close monitoring for other uncommon complications is critical for effective management. Prazosin has revolutionized the management of scorpion sting envenomation. Administration of prazosin, as early as possible, is probably the single most effective intervention for preventing complications following scorpion stings. Early and effective prazosin therapy, good supportive care, close monitoring and management of complications can limit the resulting morbidity and mortality significantly. The role of scorpion antivenom still remains controversial.

Public awareness regarding measures for prevention of sting and physician readiness to combat this common emergency can go a long way in preventing the devastating effects of this condition.

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