



A STUDY OF CLINICAL SPECTRUM AND ELECTROCARDIOGRAPHIC CHANGES IN PATIENTS OF SCORPION STING - A HOSPITAL BASED STUDY

General Medicine

Dr. Sunil Baroopal PG Resident Final Year, General Medicine, Jhalawar Medical College, Jhalawar, Rajasthan

Dr. Rameshwar Prasad Gupta* Professor, General Medicine, Jhalawar Medical College, Jhalawar, Rajasthan.
*Corresponding Author

ABSTRACT

Scorpion sting is an acute life threatening condition accounting for nearly 6.48 % of annual ICU admissions and much more out-patient visits. The objectives were to study the clinical spectrum and various electrocardiographic changes in patients of scorpion sting. This is a prospective clinical study, data collected through standardised Performa and entered in MS Excel and analysed through SPSS-20.0 (trial version) software. A total of 80 cases of scorpion envenomation with mean age of 38 years were included in the study. Majority of the patients with ECG changes had it in the form of either T wave inversion and ST segment changes, few patients had features of early myocardial infarction and varying degrees of heart blocks. Severe cardiopulmonary manifestations like myocarditis, pulmonary edema and severe hypotension leading to death, if not given proper hospital care in time.

KEYWORDS

ICU (Intensive Care Unit), ECG (Electrocardiogram), HTN (Hypertension).

INTRODUCTION

Scorpion sting is a major public health problem in many parts of the world. High prevalence, severity of symptoms and difficulty of treatment are problems of scorpion sting. This problem is more prevalent in tropical and subtropical areas. These areas include the North- Saharan African, Sahelian Africa, South Africa, the Middle East India, Mexico, Latin America and the Andean region.

Scorpion envenomation is an occupational hazard for farmers, farm labourers villagers, migrating population and hunters. They are generally found in dry, hot environment, although some species are also present in forest and wet savannahs. Scorpions are not aggressive; they do not hunt for the prey but wait for it. Scorpions are nocturnal predatory animals that feed on variety of insects, spiders and smaller scorpions. Some larger scorpions occasionally feed on vertebrates, such as smaller lizards, snakes. All species are nocturnal, hiding during the day under stones, wood or tree barks, loose tiles of hut, inside empty shoes, pockets of trousers and shirts, crevices of doors and windows.

There are about 1500 scorpion species worldwide, 50 are dangerous to humans. Almost all of lethal scorpion belongs to Buthidae family. There are about 86 species of scorpion are found in India. Only three scorpions found in India are poisonous they include:

1. Mesobuthus tamulus.
2. Palamneus swammerdami.
3. Heterometrus bengalensis.

Among the 86 species of scorpion present in India, Mesobuthus tamulus (Indian red scorpion) and Heterometrus swammerdami (Indian black scorpion) are of medical importance. It is fairly common in many parts of India like Maharashtra, Andhra Pradesh, Orissa and Rajasthan.

Scorpion envenomation following sting of the Indian red scorpion, Mesobuthus tamulus is a common emergency in several parts of rural India. This and all other venomous scorpions of clinical importance belong to the Buthidae family of scorpions, which are widely distributed in warmer parts of the old and new worlds.

Majority of deaths following scorpion envenomation in most parts of the world occur due to cardiovascular dysfunction. Neurological complications are more common than cardiovascular manifestations after sting by scorpion.

The clinical picture of Scorpion Sting (SS) poisoning depends on the subspecies, age, size, venom amount and feeding characteristics of the scorpion as well as seasonal conditions. The scorpion venom is a water-soluble antigenic complex mixture of neurotoxin, cardiotoxin, nephrotoxin, hemolysins, phosphodiesterases, phospholipase, hyaluronidases, histamine and other chemical.

Scorpion Sting Causes –

- Local tissue effects like pain, redness, edema, and paraesthesia.
- Signs of parasympathetic dysfunction included hypotension, bradycardia, excessive sweating, salivation, lacrimation, urination, defecation, priapism and gastric emptying. Sweating and salivation persists for 6-13 hours.
- Signs of sympathetic dysfunction include tachycardia, S3 gallop, arrhythmias, hypertension, hyperthermia, features of pulmonary edema. Cold extremities which persist for 24-72 hours.
- Pulmonary edema may develop within 30 minutes to 3 hours after a sting due to myocardial dysfunction secondary to intense vasoconstriction or probable direct injury. Children appear pale with clammy skin and have tachycardia with elevated blood pressure, retractions, nasal flaring and grunting with tachypnea and intractable cough. Pink frothy sputum is not always seen in adults.
- Cranial nerve effects such as difficulty in swallowing, nystagmus, blurring of vision and fasciculations.
- Restlessness and involuntary movements, seizures, altered sensorium, cerebral thrombosis, thalamus induced systemic paraesthesia, hemiplegia and aphasia.

The venom produces both local as well as systemic reactions. Local reactions consist of itching, edema and ecchymoses with burning pain. The cardiovascular manifestations comprise successively of giddiness, bradycardia, a fall of body temperature; restlessness and tachycardia; and finally pulmonary edema.

Grading According To The Severity Of Envenomation:

Grade I

Severe excruciating local pain at the sting site retaining along the dermatome, mild local edema, without systematic 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 rales)

Grade IV

Tachycardia, hypotension with or without pulmonary edema with warm extremities (warm shock) altered consciousness.

This study deals with various clinical manifestation of scorpion sting and various electrocardiographic abnormalities due to scorpion envenomation.

AIMS AND OBJECTIVES

- 1) To study the clinical spectrum in patients of scorpion sting.

- 2) To study the various electrocardiographic changes in patients of scorpion sting.

MATERIALS AND METHODS

This is a prospective study, 80 patients of scorpion sting were examined at SRG hospital, Jhalawar during the period of January 2020- October 2020. Demographic features like age, sex, time since to the arrival to the hospital and clinical parameters like pain at the site of sting, swelling, paraesthesia, profuse sweating, excessive salivation and hypotension and E.C.G. Changes

Inclusion criteria:

1. All patients with history of scorpion sting.
2. Patients aged 18 years and above.

Exclusion Criteria:

1. Patients with pre-existing:-
 - Congenital heart diseases.
 - Ischaemic heart diseases.
 - Valvular heart diseases.
2. Pregnant women.
3. Patients with Diabetes and CKD.

RESULTS

Number of cases of scorpion sting during the study period was 80. Out of which 47 were out patient cases and remaining 33 were in patients. Patients admitted with systemic manifestations account for 6.48% of total ICU admissions.

Table -1 Showing Age And Sex Distribution Of Scorpion Sting Cases.

SI No	Age group	Male		Female		Total	
		No.	%	No.	%	No.	%
1	18-27	11	24.44	8	22.85	19	23.75
2	28-37	16	35.55	12	34.28	28	35
3	38-47	10	22.22	7	20	17	21.25
4	48-57	3	6.66	4	11.42	7	8.75
5	58-67	4	8.88	2	5.71	6	7.5
6	68-77	1	2.22	2	5.71	3	3.75
7	Total	45	100	35	100	80	100

- Maximum incidence of scorpion sting was seen in the age group of 18 to 37 years, accounting for 58.75 % of the patients.
- Mean age for all patients in 38 years & SD 13.72
- Mean age for males is 37.84 years and SD 14.35
- Mean age for females 38.20 years and SD 13.07
- Majority of cases were male (56) 56.25%.
- Sex ratio for males and females is 1.28:1.

Table -2 Showing Relationship Between Age And Severity Of Envenomation.

SI NO	Age group	Severity of envenomation			Total
		Grade 2	Grade 3	Grade 4	
1.	18-27	2	11	7	20
2.	28-37	7	17	4	28
3.	38-47	-	12	5	17
4.	48-57	-	6	1	7
5.	58-67	-	4	1	5
6.	68-77	1	2	0	3
7.	Total	10	52	18	80

- All grades of envenomation were common in the age group of 18 to 37 years. 48 patients belong to this group.
- (52) Patients had grade 3 disease, about (18) of patients had grade 4 disease and only
- (10) Patients had grade 2 envenomation.

Table -3 Showing Relation Between Sex And Severity Of The Disease.

Severity	Male	Female	Total
	No.	No.	No.
Grade-2	4	6	10
Grade-3	30	22	52
Grade-4	11	7	18
Total	45	35	80

About (30) of the males and (22) of the females had grade 3 envenomation, accounting for total of 65%.

Table- 4: Showing Various Ecg Changes In Patients With Scorpion Sting

ECG changes	Number	%
Sinus tachycardia	35	43.75
SVT	-	-
Bradycardia	3	3.75
QTc prolongation	-	-
ST changes	15	18.75
T- wave changes	30	37.5
Arrhythmias	-	-
Bundle branch block	2	2.75
First degree block	3	3.75

Table -5: Showing Relation Between Severity Of Envenomation And Ecg Changes.

ECG changes	Grade-2		Grade-3		Grade-4	
	No.	%	No.	%	No.	%
Sinus tachycardia	2	2.5	28	35	5	6.25
SVT	-	-	-	-	-	-
Bradycardia	-	-	2	2.5	1	1.25
QTc prolongation	-	-	-	-	-	-
ST changes	-	-	8	10	7	8.75
T-wave changes	1	1.25	16	20	13	16.25
Arrhythmias	-	-	-	-	-	-
Bundle branch block	-	-	1	1.25	1	1.25
First degree block	-	-	2	2.5	1	1.25

DISCUSSION

Scorpion sting envenomation is relatively common medical emergency. Overall 723 cases admitted to ICCU annually during the study period. 6.48% of them are due to scorpion sting. This is a very significant number.

Age And Sex Distribution Of Cases Of Scorpion Sting:

In this study most (47) of the patients belonged to the age group of 18-37 years, accounting for total 58.75% of patients. This may be due to the fact that the scorpion envenomation is purely an accidental phenomenon, associated with increased human activity which is common during this age group. Majority (56.25%) of the patients in this study were males, this may be again because of increased outdoor activities especially during morning and evening hours.

Time of the day during sting:

Majority (53.75%) of the patients had sting during early morning hours i.e. 6 am to 12 noon. Another 32.50% had sting between 6pm to 12 pm. 8 patients had sting between 12 noon to 6 pm and only 3 patients had sting between 12 pm to 6 am. All 3 of them occurred at home, while in bed and all were multiple sting. This indicates that most of the scorpion stings (86.25%) occurred between 6 am to 12 noon and 6 pm to 12 pm, indicating the maximum activity of people during these hours; scorpions are also more active during these hours. This is in accordance with previous studies.

Table-6: Time of the day during sting

Time of sting	.No. of cases	Percentage
6 am – 12 noon	43	53.75
12 noon – 6 pm	8	10.00
6 pm - 12 pm	26	32.50
12 pm – 6 am	3	3.75

Time since sting to arrival to hospital:

75 patients in this study presented to emergency department within 24 hours (93.75%), of them 43 patients presented within first 6 hours and 32 patients in next 18 hours. Only 5 patients presented after 24 hours of sting and of these 5 patients only 2 patients had grade-4 envenomation. 2 of 7 patients who had pulmonary edema and 5 of 18 patients who had grade-4 disease were presented after 6 hours of sting. But there was no statistical correlation between the time lag in attending to emergency department and severity of envenomation. In contrary to the present study previous studies by Bawaskar. H.S, and S. Mahadevan reported that delay in hospital presentation was associated with severe

manifestation, which is noted in present study. This is because the milder case presented to hospital only when there was no relief of symptoms but most of the moderate to severe envenomation presented relatively early because of early development of annoying symptoms. Present study did not show statistically significant association between time delays in hospital presentation to severity of envenomation, this is in contrast to the previous studies. This difference may be due to increased health awareness and awareness regarding the dangers of the disease. On personal enquiry with the patients and their relatives, it was learnt that they have seen and heard of serious cases of scorpion sting envenomation hence they didn't take chance and tried to arrive to the hospital as early as possible.

On enquiry, it is learnt that majority of patients who presented after 6 hours of sting are from rural areas and reason for delay in them being,

1. Initial use of various local remedies, attending the hospital only if the symptoms did not subside or if in case the condition worsens.
 2. Lack of adequate transportation facilities.
- However the number is very small to conclude, further large scale studies are required.

Site of sting:

In the present study, 93.75% of the patients were stung on extremities and only 6.25% got it on other parts of the body. The common situation in which a person is stung by a scorpion is either when he walks into a poorly lit room or when he stretches the hands in dark corners to pick up some objects. Of the 5 patients who received stings elsewhere, 2 were on the back, 1 on the chest, 1 on the shoulder and the other was on the buttock. All these patients were stung while sleeping outside their houses in the night. People in Jhalawar prefer to sleep outside the houses because of the hot climate in summers.

CONCLUSION

The Following Were The Conclusion Drawn From The Present Study.

- Scorpion sting envenomation was a relatively common medical emergency, accounting for 6.48% of ICU admission.
- Patients of age group **18-37** years were commonly involved (58.75%) in this accidental environmental and occupational hazards.
- Male population is predominantly affected in our study, with male to female ratio of **1.28:1**.
- Majority of the patients had grade -3 envenomation accounting for 65% of the total studied population.
- Grade-4 disease accounted for 22.5% of the total cases.
- 93.75% of the patients reached hospital within first 24 hours after sting.
- Most common clinical presentation was pain; present in 96.25% of the cases.
- Profuse sweating was the commonest symptom of the sympathetic nervous system seen in 33.75% of patients and most common sign was tachycardia (43.75%).
- Most common parasympathetic symptom was excessive salivation (10%) and sign was hypotension (7.5%).
- Pulmonary edema was the most serious manifestation seen in 7 (8.75%) patients, requiring critical monitoring.
- Most common ECG change in the study was sinus tachycardia (43.75%). Other ECG changes were T wave abnormality (37.5%), ST changes (18.75%) and varying degrees of heart blocks.
- Patients in the study were treated with Prazosin; most of the patients responded well with rapid improvement in the clinical signs.
- There were three deaths in the study group accounting to 3.75% of the cases, all of them had severe hypotension and pulmonary edema and LVS 3 gallop.

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