

# A study of clinical profile and ECG changes in scorpion sting envenomation in a tertiary care hospital, Nandyal

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## Abstract

**Background:** Scorpions are predatory arachnids which are threatening human beings since centuries. There are about 86 species of scorpions found in India. In India, three species Hottentotta (previously called Mesobuthus tumulus), Palamneus swammerdami, and Heterometrus bengalensis are of medical importance. Scorpion envenomation is common in many parts of the world, particularly the tropical and subtropical regions. Morbidity and mortality depend on the time lapse between sting bite and hospitalization. **Aim:** To study the clinical profile, ECG changes, and to assess the outcome of patients in scorpion sting envenomation among the study group admitted in a tertiary care hospital. **Materials and Methods:** A Hospital-based Prospective study was conducted in the Department of Medicine, Santhiram medical college and general hospital for a six months period. Universal Sampling Technique was used for the selection of study subjects. All the patients coming to the medicine department during the study period with age >15 years and Patients with scorpion sting envenomation were taken for study after taking prior informed consent. The final sample size was 50 subjects. **Results:** Mean of study subjects was 28 years (range from 15-70 years) with M: F ratio of 1.63:1. Pain at the site of sting (100%), Paresthesia (56%), Swelling (50%), profuse sweating (62%), Excessive salivation (28%), Nausea and vomiting (22%), Cough (36%), dyspnea (32%), palpitation (18%), Blurring of vision (12%), Pain abdomen (10%), altered sensorium (8%) among study group. ECG changes were observed in 44 (88%) of patients with Sinus tachycardia being the commonest finding, and others include first degree AV block, prolonged PR interval, and ST-T changes. Out of 50 patients, one patient died due to myocarditis and pulmonary edema, one patient developed hemiparesis and discharged with residual weakness, and the majority of patients (96%) recovered completely. **Conclusion:** When agricultural activities are high, and scorpions come out due to the sudden rise in temperature. Myocarditis and pulmonary oedema are fatal complications that require urgent attention and ICU care for a few hours to days. Illiteracy, ignorance, poverty, traditional faith healers trying treatment in remote areas lack transport and nonavailability of ventilation facilities in the nearby hospitals and to delay inappropriate treatment.

**Key Word:** scorpion sting envenomation.

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## INTRODUCTION

Scorpions are predatory arachnids which are threatening human beings since centuries<sup>1</sup>. There are about 86 species of scorpions found in India. In India, three species Hottentotta (previously called Mesobuthus tumulus), Palamneus swammerdami, and Heterometrus bengalensis are of medical importance<sup>2,3,4</sup>. Scorpion envenomation is common in many parts of the world, particularly the tropical and subtropical regions. It is the most common problem, acute life-threatening medical emergencies faced in rural areas, and for medical help, villagers have to travel

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10-20 kilometers. The clinical features vary from mild pain to serious systemic manifestations, most commonly cardiovascular, often leading to death. Morbidity and mortality depend on the time lapse between sting bite and hospitalization.

### AIM AND OBJECTIVES

To study the clinical profile, ECG changes and to assess the outcome of patients in scorpion sting envenomation among the study group admitted in a tertiary care hospital.

### MATERIALS AND METHODS

A hospital-based prospective study was conducted in the Department of General Medicine, Santhiram Medical College, and General Hospital for a six months period after taking approval from the Hospital Ethics and Research Committee.

#### Sampling Technique and Sample Size

Universal Sampling Technique was used for the selection of study subjects. Patients presenting with scorpion sting envenomation to Santhiram Medical College and General Hospital during the study period and fulfilling the inclusion criteria were taken for study after taking prior informed consent. The patients included in the study were

from both ICU and wards. The final sample size came to be 50 subjects.

#### Inclusion Criteria

- 1) Cases of definite scorpion sting in a patients of 15 years and above, with the scorpion, was seen in the vicinity of the patient.
- 2) Patient with history of bite with classical clinical manifestations of scorpion sting envenomation were included in the study.

#### Exclusion criteria

- 1) Cases of scorpion sting in a patients less than 15 years of age.
- 2) Unknown bite, cases where clinical manifestation is not compatible with Scorpion sting envenomation.

#### Data Analysis

All patient profiles were recorded in proforma, and findings were tabulated, SPSS24 was used for the analysis of the data.

### RESULTS

Mean of study subjects was 28 years (range from 15-70 years) with M: F ratio of 1.63:1.

**Table 1: Distribution based on Age**

Age	Frequency	Percent
15-20 YEARS	12	24.0
21-30 YEARS	15	30.0
31-40 YEARS	10	20.0
41-50 YEARS	7	14.0
51-60 YEARS	4	8.0
61-70 YEARS	2	4.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

Pain at the site of sting(100%), Paresthesia(56%) ,Swelling (50%),profuse sweating(62%),Excessive salivation(28%),Nausea and vomiting (22%) ,Cough(36%), dyspnea(32%) , palpitation(18%) ,Blurring of vision (12%),Pain abdomen (10%), altered sensorium (8%) among study group.

**Table 2: Presenting Symptoms**

SYMPTOMS	Males (n=29)		Females (n=21)		Total	
	No.	%	No.	%	No.	%
<b>Pain at the site</b>	29	100	21	100	50	100
<b>Paraesthesia</b>	15	51.7	13	61.9	28	56
<b>Swelling at the site</b>	12	41.3	13	61.9	25	50
<b>Profuse sweating</b>	18	62	13	61.9	31	62
<b>Local swelling</b>	9	31	5	23.8	14	28
<b>Nausea/ Vomiting</b>	5	17.2	6	28.5	11	22
<b>Cough</b>	10	34.5	8	38	18	36
<b>Dyspnea</b>	9	31	7	33.3	16	32
<b>Palpitation</b>	6	20.7	3	14.2	9	18
<b>Blurring of vision</b>	5	17.2	1	4.7	6	12
<b>Pain abdomen</b>	3	10.3	2	9.5	5	10
<b>Altered sensorium</b>	3	10.3	1	4.7	4	8

**Table 3: Physical signs among the study group**

SIGNS	MALE		FEMALE		TOTAL	
	No.	%	No.	%	No.	%
Tachycardia	22	75.8	17	80.9	39	78
Bradycardia	2	6.9	0	0	2	4
Tachypnea	11	37.9	6	28.5	17	34
Hypertension	8	27.5	5	23.8	13	26
Hypotension	3	10.3	5	23.8	8	16
Cold periphery	10	34.5	9	2.8	19	38
Piloerection	4	13.7	2	9.5	6	12
Priapism	4	13.7	0	0	4	8
Rhonchi	2	6.9	2	9.5	4	8
Abdominal tenderness	2	6.9	4	19.0	6	12
Encephalopathy	1	3.4	1	4.7	2	4
FND	0	0	1	4.7	1	2

Tachycardia was present in 39 patients (78%).Bradycardia was present in 4% of the patients. Tachypnea (34%), Hypertension( 26%), Hypotension(16%),Cold peripheries (38%), Piloerection (12%), Priapism (8%),Bronchoconstriction (8%). Encephalopathy (4%),right hemiparesis(2%) present among study group. ECG changes were observed in 44(88%) of patients with Sinus tachycardia being the commonest finding; others include first degree AV block, prolonged PR interval, and ST-T changes. In the present study, 39 (78%) of patients had sinus tachycardia, and it is the commonest ECG change noted. Seven patients(14%)had ST-T changes. 3(6%) patients had a 1st degree AV block with prolonged PR. 3(6%) patients had QTc prolongation. One patient had SVT. 2D ECHO was normal in 92% of patients, while 8% of patients developed abnormalities like decreased LV EF, RWMA.

22 % of patients developed pulmonary edema, which was evident on chest x-ray, while 78% of patients had a normal chest x-ray. Out of 50 patients, one patient died due to myocarditis and pulmonary edema, one patient developed hemiparesis and discharged with residual weakness, and the majority of patients (96%) recovered completely.

**Table 4: Outcome of the study group**

OUTCOME	Frequency	Percent
RECOVERED	48	96.0
HEMIPARESIS	1	2.0
EXPIRED	1	2.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

## DISCUSSION

Scorpion sting is a common occurrence in this region and poses a considerable public health problem. It is an occupational, environmental hazard, more common from April to early June. When agricultural activities are high, and scorpions come out due to the sudden rise in temperature. Most of the scorpion sting in India is due to Indian red scorpion, and cardiovascular complications are

most common. Myocarditis and pulmonary oedema are fatal complications that require urgent attention and ICU care for a few hours to days. Delay in recognition of pulmonary edema and hypoxemia increases morbidity and mortality. Illiteracy, ignorance, poverty, traditional faith healers trying treatment in remote areas lack transport and nonavailability of ventilation facilities in a nearby hospital and to delay inappropriate treatment. The use of Prazosin has revolutionized the management of scorpion sting envenomation. Early and effective Prazosin therapy is the single most economical intervention for preventing complications. Since the role of scorpion antivenom in Indian red scorpion sting is controversial, Prazosin is an effective pharmacological and physiological antidote to venom. Irrespective of what specific drug is given, the majority of the patient requires good supportive care to alleviate the cardiovascular effects and limits the mortality. Kumaraswamy et al. found (2014)<sup>5</sup> that swelling at the site was present in 45(42.5%) of the patients. Three patients had local cellulitis and gangrene. Altered sensorium was seen in 19 patients; three of them died, two presented with hypotension, and one with hypertension developed hypotension later. In ABDI study (2013)<sup>6</sup> regarding ECG and ECHO findings in scorpion sting patients, the most common abnormality in ECG was PVC (13.9%) and others were including ST depression (9.3%), T-inversion (4.6%), AF (4.6%), U-wave (2.3%) and sinus arrhythmia (2.3%). There is no case of atrial-ventricular blocks. But studies have shown that there is no association between the severity and frequency of ECG changes. Early and effective prazosin therapy has reduced mortality. A study by H.S. Bawaskar and P.H. Bawaskar (1998)<sup>7</sup> has shown that scorpion antivenom and Prazosin are equally beneficial in preventing complications, but Prazosin doesn't have an anaphylactic reaction, orally-administered, very cost-effective. The case fatality rate in the present study is 2%. Mortality in the study by Das S.<sup>8</sup> is 6.2%, and Bawaskar H.S.<sup>9</sup> is 6%.

## CONCLUSION

These are the following findings from this study;

1. The maximum number of cases were noted in younger individuals (15-30 years) in this accidental environmental hazard.
2. The male population is predominantly affected in this study, with a male to female ratio of 1.63: 1.
3. Most stings sustained during day time, in early hours when agricultural activities were highest.
4. Extremities were the most common body part stung, and there was no significant association between the site of sting and severity.
5. A significant delay in admission to hospital and administration of Prazosin was due to the fact that most of the time spent in taking conventional therapy in rural areas, traveling from remote regions.
6. Sting due to *Mesobuthus* species (red scorpion) was common than *Palamneus* species (Black scorpion).
7. Pain at the sting site was the most common presenting symptom, and tachycardia was the most common sign.
8. Hypertension was the common complication encountered.
9. Pulmonary oedema was the most severe complication encountered in a significant number of the patient requiring intensive monitoring.
10. The majority of the patients presented with grade II envenomation (38%), but patients with severe disease grade III and grade IV together constituted a significant proportion (40%). This is because of the referral pattern.

11. Altered sensorium was the most common CNS manifestation, with one patient developing focal neurological deficit.
12. Apart from sinus tachycardia, the most common ECG changes were ST-T wave changes.

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