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Original Research Paper

General Medicine

PROFILE OF ELECTROCARDIOGRAPHIC CHANGES IN SCORPION - ENVENOMATION

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ABSTRACT Patients presenting with alleged scorpion envenomation is a common presentation in rural tertiary hospitals. The clinical profile of scorpion envenomation has been well established. However, data on the electrocardiographic changes in scorpion envenomation, particularly of patients presenting to a south Indian rural tertiary hospital are scant. In this cross-sectional study of 90 patients presenting to our hospital, we describe the electrocardiographic findings of patients with scorpion envenomation. Data on correlation between severity of scorpion envenomation and ECG changes are also presented. The clinical profile of scorpion envenomation is varied, in its severity and by the type of scorpion, hence, the ECG may be a cheap and simple tool to detect warning signs early to initiate timely and appropriate management.

KEYWORDS : scorpion, envenomation, ecg, severity

INTRODUCTION

Scorpion envenomation is an occupational hazard for farmers, farm labors, villagers, migrating population and hunters. Except for *Hemiscorpius lepturus*, all venomous scorpion species, belong to the large family *Buthidae*.[1] In India, many people are stung by the red scorpion (Mesobuthus tamulus) with fatalities in adults and children. Scorpion sting is a life threatening medical emergency of villagers in India.[2]

Scorpions are generally found in dry, hot environments, although some species also occur in forest and wet savannas. All species are nocturnal, hiding during the day under stones, wood, or tree barks. The risk of scorpion sting is higher in rural areas, but some species are found in close contact with man, and live around or inside human dwelling[3]. Fatalities due to sting by Buthidae have been reported from Chennai, Rayalaseema, Pondicherry and rural Maharashtra.[4,5] The annual number of scorpion stings cases exceeds 1.23million, of which over 32250 may be fatal.[1]

Symptoms vary depending on the species and geographical area. The most frequently encountered symptom is excruciating local pain. Early symptoms include vomiting, profuse sweating, piloerection, alternating bradycardia and tachycardia, abdominal colic, diarrhea, loss of sphincter control and priapism. Later severe life-threatening cardiorespiratory effects may appear such as hypertension, shock and bradyarrhythmia, ECG changes and pulmonary edema with or without myocardial dysfunction.[6]

Real incidence, morbidity and deaths are scarce, because most of victims do not seek medical treatment or public health structure and prefer to consult traditional healers moreover scorpion sting is not included in a list of notifiable diseases, the actual burden of scorpion stings is likely to be underestimated. Literature on the manifestation of scorpion envenomation are lacking due to lacunae in reporting and there is no universally accepted protocol for the treatment of scorpion envenomation, although hospitals in Saudi Arabia follow a national protocol for the management of scorpion sting cases.7 As the number of cases in this geographical area of study is high, studying the ECG changes and various presentations of Scorpion Envenomation may help in improving patient outcomes.

Study Procedure – This was a descriptive cross-sectional study conducted by the Department of General Medicine, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda, Telangana. The study was conducted for 2 years from September 2016 to September 2018.

INCLUSION CRITERIA

All patients above age 18 years who were admitted with a reliable history of scorpion sting were included in this study.

EXCLUSION CRITERIA

- Patients with doubtful scorpion sting by history.
- Patients below 18 years of age.
- Patients who had history of diabetes.
- Patients who had history of recent myocardial infarction.

RESULTS & DISCUSSION - A total of 90 patients with scorpion envenomation were included in that final study. Their clinical and electrocardiographic profiles were recorded and are presented below –

Table 1. Distribution of scorpion sting cases according to patient's gender:

Patient's Gender	Number of Patients (n= 90)	Percentage (%)
Male	53	58.8%
Female	37	41.1%

In this study, we noted that males were affected more frequently than females. Among 90 patients, 53 were male and 37 were female. The distribution of these male and female patients according to

various age groups is presented in Table 2 below –

Table 2. Distribution of cases according to patient's gender within the age group:

Age Group (years)	Number (n=90)	Male (n=53)	Female (n=37)
<20	5	2 (3.7%)	3 (8.1%)
21-30	26	15 (28.31%)	11 (29.7%)
31-40	29	19 (35.8%)	10 (27.02%)
41-50	11	6 (11.31%)	5 (13.5%)
51-60	14	8 (15.09%)	6 (16.2%)
>60	5	3 (8.1%)	2 (3.7%)

Data from Table 2 shows that the highest prevalence of alleged scorpion envenomation was in the 21 to 30 years age group in females (n = 11/37) and for males, the highest

prevalence was in the 31 to 40 years age group with 19/53 patients. Very few elderly patients presented with scorpion envenomation.

Clinical effects of the envenomation depend upon the species of scorpion and lethality and dose of venom injected at the time of sting. Severe effects are seen in first victim than envenomed by same scorpion to subsequent victim. Severity of envenoming is related to age, size of scorpion and the season of the sting and time elapsed between sting and hospitalization.[7,8] Severity of scorpion sting occur in children with 3.9-10%fatality irrespective of intensive care management from Israel, Turkey, and India.[9, 10, 11, 12] Clinically "autonomic storm" evoked due to venomous envenoming is characterized by transient parasympathetic (vomiting, profuse sweating, ropy salivation,bradycardia, ventricular premature contraction, priapism in male,

hypotension) and prolonged sympathetic (cold extremities, hypertension, tachycardia, pulmonary edema and shock) stimulation.[13,14,15,16,17]

On basis of clinical manifestations at the time of arrival to hospital and according to severity they are graded in 3 grades.[18]

Mild Envenomation: - Local Pain, tingling , sweating, vomiting. No cardiovascular symptoms

Moderate Envenomation:-Profuse sweating, sinus tachycardia or bradycardia, T wave abnormalities on ECG, hypertension, hypotension+ local signs.

Severe Envenomation:-Pulmonary oedema + moderate envenomation signs

The clinical severity of cases with scorpion envenomation is presented below in Table 3 below. More than 90% of cases were of Mild to Moderate severity, with an even distribution among the two grades, with 38/90 of mild severity and 37/90 of moderate severity. Only 15/90 cases were of severe grade of which 12/15 were male. Therefore, it can be concluded that males are strongly predisposed to severe scorpion envenomation.

Table 3. Distribution of cases according to grade:

Grade	Male	Female	Total
Mild	20 (52.6%)	18 (47.3%)	38
Moderate	20 (54.05%)	17(45.94%)	37
Severe	12 (80.00%)	3 (20.00%)	15

ECG changes observed in these 90 study patients are presented below in Table 4 –

Table 4. Profile of Electrocardiographic Changes in Patients with Scorpion Envenomation :

ECG Findings	Number of patients (n=90)	Percentage (%)
Normal	47	52.22%
Sinus Tachycardia	29	32.22%
ST depression	3	3.33%
ST elevation	1	1.11%
ST depression with T wave inversion	1	1.11%
RBBB	2	2.22%
Tall T-wave	3	3.33%
Sinus Bradycardia	1	1.11%
T-Wave inversions	5	5.55%

The most common ECG finding was a normal sinus rhythm with normal heart rate. The most common ECG abnormality noted was Sinus Tachycardia. Among patients with a normal ECG, 31/47 had mild scorpion envenomation while the remaining 16 had moderate scorpion envenomation. None from the severe grade group had a normal ECG. Of the 29 patients with Sinus Tachycardia, all 15/15 from the severe group showed sinus tachycardia and 14 from the moderate severity group developed sinus tachycardia.

All 3 patients who developed ST segment depression were from the moderate severity group. Apart from sinus tachycardia, global ST segment elevations, ST segment depression with T wave inversions, Right bundle branch block (RBBB), Tall T waves and Sinus Bradycardia were invariably observed among patients of severe group. 3/5 patients with T wave inversions had moderate severity and the other 2 were from the severe group.

CONCLUSION -

In this study, the incidence of scorpion sting in males (58.8%) was found to be higher than in females. The incidence of scorpion envenomation was found to be maximum in the age group of 31-40 years (32.2%) and 21-30 years (28.8%). This indicates that the risk of exposure to scorpion sting is at work in agricultural fields and possibly during household chores.

Thirty-eight patients (42.2%) presented with Mild grade of envenomation, thirty-seven patients (41.1%) presented with Moderate grade of envenomation and fifteen (16.6%) presented with Severe grade of envenomation.

Sinus tachycardia (32.22%) was the commonest ECG abnormality seen in the study. Predictors of severe envenomation include global ST segment depressions, global ST segment elevations without reciprocal changes, ST segment depressions with T wave inversions, Tall T waves and Sinus Bradycardia. T wave inversions can also be a marker of moderate to severe envenomation.

Therefore, we conclude that the ECG is a simple, reliable and cost-effective bedside investigation that can be used to predict clinical severity of scorpion envenomation.

REFERENCES -

1. Chippaux JP and Goyffon M. Epidemiology of scorpionism: a global appraisal. *Acta Trop* 2008;107:71-9.
2. Bawaskar HS, Bawaskar PH. Sting by red scorpion (Buthus tamulus) in Maharashtra state, India: A clinical study. Trans Roy Soc Med Hyg1989;83:858-860.
3. Chowell G et al. Predicting scorpion sting incidence in an endemic region using climatologically variables. *Int J Environ health Res*200;15:426-35.
4. Santhanakrishnan BR, et al : Cardiovascular manifestations of scorpion sting in children. Indian Pediatr1977;15:353-356.
5. Handergal NH, Malleraja Gowda K, Ramnath TE, Ramesh Babu KA:A clinical study of one hundred cases of scorpion sting. J Assoc PhysIndia 1986;34:27-40
6. Amitai Y, MinesY, Aker M, Goitein k: Scorpion sting in children. Clin Pediatr24:136-140, 1985
7. Ouanes –Basbes l, El- atrous S, Aubrey N, Eiayeb M and AbrougF. Direct vs mediated effects of scorpion venom : an experimental study of the effects of second challenge with scorpion venom. *Intensive Care Medicine* 2005;31:441-46.
8. Bawaskar HS and Bawaskar PH. Consecutive sting by red scorpion evokes severe cardiovascular manifestations in the first, but not in the second victim: a clinical observation. *J Trop Med Hyg*1991;94:231-33.
9. Bahloul M, Chabchoub I, Chaari A, Chatara K, Jallel H, DammakH, Ksibi H, Chelly H, Rekik N, Ben Hamida C, and Bouaziz M.Scorpion envenomation among children: clinical manifestations and outcome (analysis of 685 cases). *Am J Trop Med Hyg*2010;83:1984-1092.
10. Amatai Y, Mines Y, Akar M, and Goiten K. Scorpion sting in children. *Clinical Pediatric*1994;24:136-40.
11. Bosnak M, Ece A, Yolbas I etal. Scorpion envenomation in children in southeast turkey. *Wilderness and Environmental Medicine*2009;20:118- 24.
12. Bawaskar HS and Bawaksar PH. Cardiovascular manifestations of severe scorpion sting in India (Review of 34 children). *Annal Trop Pediatr* 1991;11:481-88.
13. Gueron M, Yaron R: Cardiovascular manifestations of severe scorpion sting. Chest 1970; 57:156-162.
14. Bawaskar HS. Diagnostic cardiac Premonitory signs and symptoms of red scorpion sting. *Lancet* 1982;2:552-54.
15. Bawaskar HS and Bawaskar PH. ` Sting by red scorpion (*Buthotus Tamulus*) in Maharashtra state,
16. India: a clinical study. *Trans Roy Soc Trop Med Hyg*1989;83:858-60.
17. Ismail M and Abd-elsalam MA. Are the toxicological effects of scorpion envenomation related to tissue venom concentration? *Toxicon* 1988;233-56.
18. Ismail M. The scorpion envenoming syndrome. *Toxicon*1995;33:82558.

19. Suvarna Netaji Patel: A retrospective Analysis of α Rural set up experience with special reference to Dobutamine in Prazosin-resistant Scorpion Sting cases. JAPI April 2009; 57: 301-303.