



ORIGINAL RESEARCH PAPER

General Medicine

SCORPION BITE INDUCED PULMONARY EDEMA

KEY WORDS: Pulmonary edema, scorpion bite

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ABSTRACT **Background:** Scorpion bites are common in rural India. (1) Most of them are harmless, but some present with cardiotoxic manifestations. We studied patients with scorpion sting having Pulmonary edema. The etiology of pulmonary edema in severe scorpion sting is related to venom effect on sympathetic nervous system and the adrenal secretion of catecholamines as well as to the toxic effect of the venom on the myocardium itself. **Methods:** 58 patients, who were admitted in MICU, following scorpion sting were included in this study. Patient's clinical evaluation was done. Chest X ray was done. **Results:** Out of 58 cases, Chest X ray was normal in 52 cases and abnormal in 6 cases. Abnormal chest X Ray was suggestive of pulmonary edema. These 6 Patients having difficulty in breathing with pink frothy sputum and on examination bilateral crepitations on chest auscultation present. **Conclusions:** Clinical suspicion of acute pulmonary edema in every scorpion sting patient must be there. Chest X ray was done bedside, it is a cost effective tool and should be done in all cases. Whenever it is available, it must be done in cases of scorpion sting. Thus, proper clinical work along with relevant investigations and management as per standard protocol may save many more lives.

INTRODUCTION

Creatures that are capable of producing a poison in a gland and then delivering that toxin by stinging or biting are called venomous animals. Arthropods (scorpions, spiders, bees, and wasps) are examples.

Scorpion envenomation is potentially fatal in many regions worldwide. Children form the majority of victims. The sting effect depends on the size of the victim, the season, the age of the offender and the delivery dose of the scorpion. (2,4) Several clinical syndromes with variable hemodynamic patterns may dominate the clinical presentation. (3,4)

Scorpion bites are common in our country, particularly in the rural areas. Among 86 species of scorpions present in India, Mesobuthus tumulus (Indian red scorpion) and Heterometrus swammerdami are of medical importance. (5) Though local symptoms including severe pain and burning sensation at the site of sting are the most common manifestations, systemic complications can ensue. (6)

Scorpion venom is cocktail of many small molecular weight proteins which are serotonin (causing local pain), histamines and histamine releasers, neurotoxin, protease inhibitors, phospholipases, hyaluronidases, mucopolysaccharidosis. (7)

Scorpion venom contains several low-molecular weight neurotoxic proteins that act mainly on two classes of ion channels: the sodium and potassium voltage-gated channels and caused by the massive release in catecholamines (catecholamines storm) due to sting a severe alteration gets induced on Left Ventricle (LV) contractility (scorpion-related cardiomyopathy). Not only scorpion-related cardiomyopathy but also increased pulmonary capillary permeability sourced from excessive stimulation of alpha receptors are advocated to be the underlying cause of pulmonary edema following scorpion envenomation. (8,9)

In treatment of pulmonary edema arising from scorpion envenomation the same principles as those for the treatment

of cardiogenic pulmonary edema shall be followed.

METHODS

Observational study was conducted in the department of medicine, Jhalawar medical college, Jhalawar, Rajasthan, India from June 2021 to October 2022 on 58 patients who were admitted in MICU, following scorpion sting. 58 patients, who fulfilled the inclusion criteria and having none of the exclusion criteria and who/their relatives gave consent to participate in this study were included in the study.

Inclusion Criteria

Patients with a history of scorpion sting. Age and gender of patients aged 18 years to 65 years, both male and female patients.

Patients who were willing to undergo this study their written and informed consent was taken.

Exclusion Criteria

Pre-existing cardiac, respiratory, hepatic, metabolic or renal disorder, multisystem disease.

Non-willing/uncooperative patients were not included.

METHODOLOGY

All the patients and/or his/her legally acceptable representative were provided complete information regarding the aims and objectives, procedure of the study. A written Informed consent was taken from each patient or the relative. Patient's clinical evaluation was done as per standard proforma wherein details like time and site of scorpion sting, duration of symptoms, physical examination and relevant investigation-chest X Ray.

RESULTS

58 patients were admitted in MICU, out of which 52 patients were normal and 6 patients having difficulty in breathing with bilateral crepitations on chest auscultation with pink frothy sputum and chest x-ray was suggestive of pulmonary edema. 58 patients were included in the analysis. There 36(62.06%) males and 22(37.93%) females. The mean age (\pm SD) was 29.4 \pm 11.2 years with a range of 18 to 65 years.

Almost all patients exhibited pain at the site of sting, tachypnea and tachycardia at the time of ICU admission.

DISCUSSION

Pulmonary edema (PE) is a life-threatening complication of stings from scorpions of different species. It results from acute left ventricular dysfunction and myocardial damage. (10,11)

It can be diagnosed from the analysis of clinical signs and chest roentgenogram abnormalities.

We tried to find some simple parameters associated with the presence of PE that would justify urgent treatment, even when the diagnosis of PE is uncertain.

The correlation between young age and severity of clinical manifestations after scorpion envenomation is well established. (12)

In our study, we found that the mean age of the group with PE was 29.4 ± 11.2 years.

Mounir Bouaziz et al. studied the mean (± SD) age was 17.5 ± 17.7 years, ranging from 3 to 76 years. The pulmonary edema group included 294 patients (68.7%). A multivariate analysis found the following factors to be correlated with a pulmonary edema: age less than 5 years (p = 0.04), sweating (p = 0.004), agitation (p = 0.01), leukocytes of 25000 cells/mm3 or more (p = 0.02) and a plasma protein concentration of 72 g/L or more (p < 0.0001). In addition, a plasma protein concentration of 72 g/L or more predicted the presence of pulmonary edema with a sensitivity of 78% a specificity of 88%, a positive predictive value of 93% and negative predictive value of 64%. Almost 84% of patients having a respiratory rate of 30 breaths/minute associated with agitation and sweating were classified in the pulmonary edema group. This clinical association indicates the presence of pulmonary edema with a specificity of 84.3% and a positive predictive value of 87.5%. (13)

H.S. BAWASKAR et al. studied One hundred twenty-one scorpion sting patients who were admitted to hospitals in Mahad, Maharashtra state, India, during 1986-89. Sixty-six (54.5%) victims had hypertension (mean blood pressure 96 to 160 [average 118.6] mmHg). Twenty-four (19.5%) victims demonstrated tachycardia, with heart rates ranging from 110 to 215 (average 156) beats per minute. Twenty-two (18.8%) had pulmonary edema, while nine (8.5%) died. Analysis of our data suggests that cardiovascular morbidity and mortality depends upon the time between the stings and hospitalization or administration of vasodilators. Current management of scorpion envenomation consists of rapid reduction of hypertension with sublingual nifedipine, postsynaptic alpha adrenergic blockade with prazosin hydrochloride and digoxin therapy for myocardial failure. Massive pulmonary edema can be treated with sodium nitroprusside. In our setting, mortality is reduced by early hospitalization, even though specific antivenom is not available in India. (14)

CONCLUSION

In scorpion envenomation, patients can present with shortness of breath with pink frothy sputum, respiratory rate of ≥30 breaths/minute (tachypnoea), tachycardia, agitation, sweating suggest the presence of Pulmonary Edema. These above-mentioned diagnostic parameters can supplement the role of lung auscultation and chest x-rays in the diagnosis of PE secondary to scorpion envenomation and early treatment of pulmonary edema.

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