International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsciencejournal.com
Volume 4; Issue 6; June 2018; Page No. 119-122

Clinical Profile of children with Scorpion Sting Envenomation presenting in tertiary level teaching hospital of North India

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Abstract
Background: Scorpion envenomation is common in tropical and subtropical regions, especially in north Africa, Latin America, India, and the middle East, where it is seen as a public-health problem. In spite of incidence of scorpion stings being higher in adults severity of envenomation is much greater in children, case fatality rate being upto 10 times higher than in adults. In spite of advances in recognising pathophysiology and therapy, the mortality remains high in rural areas due to lack of access to emergency medicare. Difficulty in recognition of various signs and symptoms results often in delay as well as wrong treatment at rural settings. This can lead to high morbidity and mortality rate of scorpion envenomation in rural areas. Hence based on above findings study had been planned in north Indian Tertiary care hospital regarding the clinical profile of the scorpion bite.
Objective: Clinical Assessment of Scorpion Sting Envenomation in Children presenting in PMCH.
Method: This study was planned in Department of Paediatrics in Patna Medical College and Hospital, Bihar, India. The data from the 100 patients were collected. Relevant epidemiological patient details were recorded. The information related to site of sting, Local symptoms, Systemic signs, Severity & Outcome of the patients enrolled in the study were collected.
Result: scorpion sting was found to be more common in male between age of 1 to 5 years. Pain was most common symptoms with tachycardia being most consistent finding.
Conclusion: Early Hospitalization and administration of accurate dose of prazosin and closely monitoring the victim in intensive care unit will save many lives.

Keywords: scorpion sting, Envenomation, childrens, PCMH, etc.

Introduction

Worldwide, the annual number of scorpion stings is greater than 1.2 million with more than 3250 deaths. There are considerable geographical variations, at the level of both the incidence and severity of envenomation. Scorpions are found in the deserts of Arizona, Mexico, South America, north and South Africa, Middle East and India. Another factor is the environment. Bark scorpions, commonly known as house scorpion and can be hiding in the firewood, bed linen, clothes, garbage pails, and shoes. Scorpions are more likely to be seen during spring and summer. It is more likely to encounter dangerous scorpions when on a hike or camping. Scorpion stings are painful. Many may go through minor problems like swelling, tingling or numbness due to the sting. A bark scorpion sting can cause severe symptoms, as its venom is more potent. Young children and older adults may require immediate treatment. The factors that may increase the risk of scorpion stings are location, environment, season and travel.

Scorpions are a member of the Arachnida class and are closely related to spiders, ticks, and mites. Scorpions have two pincers, 8 legs and an elongated body with a tail composed of segments; they range in length from about 9 to 21 cm. Some species are smaller, more translucent, and harder to see. They may appear as a thin string on the ground. The last tail segment contains the stinger (also termed a telson) that transmits a toxin to the recipient of a sting. Most scorpions are harmless. Although about 2000 species exist, only about 25-40 species can deliver enough venom to cause serious or lethal damage to humans. One of the more venomous or potentially dangerous species, especially for infants, young children, and the elderly in the United States is Centruroides exilicauda or bark scorpion. Contact with scorpions is usually accidental. Scorpion stings are painful, and they can be fatal, particularly to children. Scorpions may sting more than once; the stinger, located at the end of the tail segment is usually not lost or left in the person's tissue after a sting [1].

In many tropical and subtropical regions of the world scorpions, crab like arachnids are the most important venomous animals after snakes. Scorpions are eight-legged arthropods; order Scorpionida and class Arachnida. The terminal segment, called the telson (bulb containing a pair of venom secreting salivary glands), contains two venom glands connecting with the curved needle sharp sting that is used either for defense or to obtain food. They do not deliberately attack man, but accidental contact results in sting. The length of adult scorpions varies from under 2 cm to about 20 cm but the length does not relate to its toxicity (some of the most dangerous scorpions are only 2–4 cm long). It takes 6–10 months for the new born scorpions to become poisonous. Scorpions are viviparous and great cannibals (young ones

sometimes nibble mother scorpion to death!). The toxicity of scorpion venom is worse than that of the snakes but only a small quantity is injected. "Once stung, twice shy" is an old adage on scorpion sting.

In spite of advances in recognising pathophysiology and therapy the mortality remains high in rural areas due to lack of access to Medicare. Since the advent of scorpion antivenom (SAV), prazosin, dobutamine and intensive care facilities the fatality due to scorpion sting has been significantly reduced [2].

Scorpion sting envenomation with systemic manifestations is a life threatening emergency and poses a significant health problem in children. Mesobuthus tumulus or Indian red scorpion, the most toxic species in India, is abundantly found in coastal areas and para-Gangetic regions. In envenomed children, serum venom concentration peaks at about 2 hours, and its level is directly related to clinical manifestations [3] which also depend upon the age of the patient, the season of the sting and the time lapse between the sting and the hospitalization. Children are more likely to develop rapid deterioration because of their lesser body weight. The critical time period in cardiopulmonary dysfunction ranges from two to several hours after the sting.

Mesobuthus tumulus venom is a potent sodium channel activator which results in autonomic storm. It initially leads to a transient cholinergic phase followed by sustained adrenergic hyperactivity, which is a venom dose-dependent phenomenon. The severity of envenomation and mortality are related to hemodynamic and cardio-respiratory dysfunctions with cardiac failure and pulmonary edema. The myocarditis is due to the direct effect of venom on the myocardium, hypoxia in the presence of increased catecholamines, and altered permeability of myocardial cell membrane affecting electrical properties and abnormalities in electrolytes fluxes. Coronary microvascular spasm due to catecholamine overstimulation may be the underlying pathophysiology triggering the myocardial perfusion derangement [4]. Pulmonary edema may be due to direct effect of the toxin on the myocardium and impairment in the clearance of alveolar fluid mediated by epithelial sodium channel and sodium–potassium pump (Na+/K+-ATPase) [5]. Furthermore, a-toxin causes a massive release of vasoactive peptide hormones, including endothelin-1, which impairs the clearance of alveolar fluid.

There is lack of adequate emergency medical facilities. This can lead to high morbidity and mortality rate of scorpion envenomation in rural areas. Hence based on above findings study had been planned in north Indian Tertiary care hospital regarding the clinical profile of the scorpion bite [6].

Methodology

The study was planned in Department of Paediatrics in Patna Medical College and Hospital, Bihar, India. The data from the 100 patients were collected and presented as below. The aim and the objective of the study are conveyed to all patients.

The Inclusion Criteria of the present study is includes the children's below 14 years of age reported with confirmed scorpion sting bite. The exclusion criteria of the present study is children's admitted with unknown bite.

The age, sex, geographic origin of the patients was noted. The information related to site of sting, Local symptoms, Systemic signs, Severity &Outcome of the patients enrolled in the study were collected and presented as below.

Results & Discussion

The data from the 100 patients admitted to PMCH for positive scorpion sting were collected and presented as below. The table 1 represents the data of the age, sex and the geographical area of scorpion sting patients.

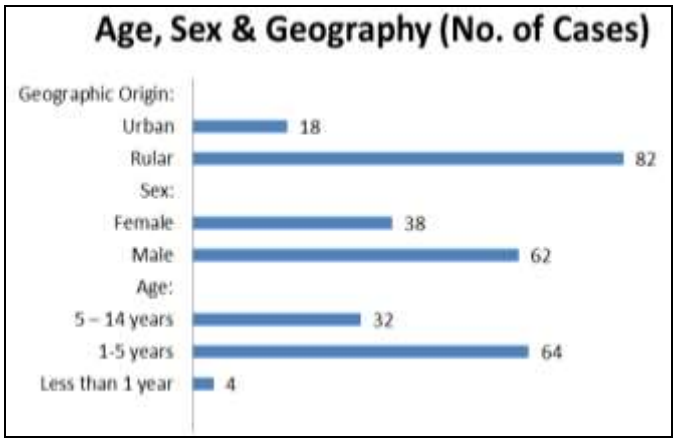

Fig 1: Age, Sex & Geography

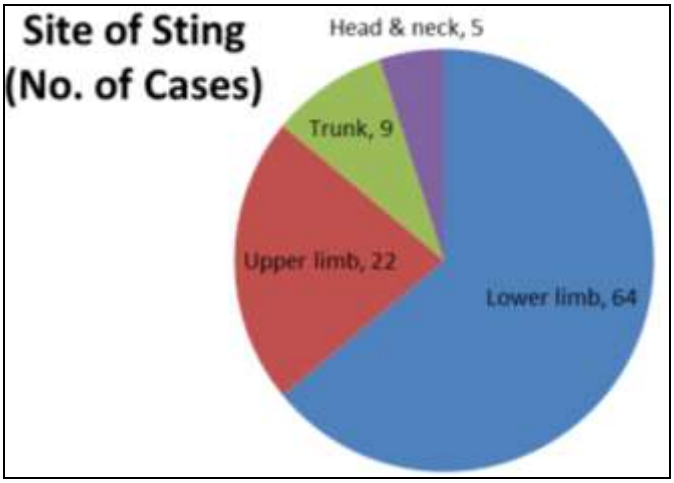

Fig 2: Site of Sting

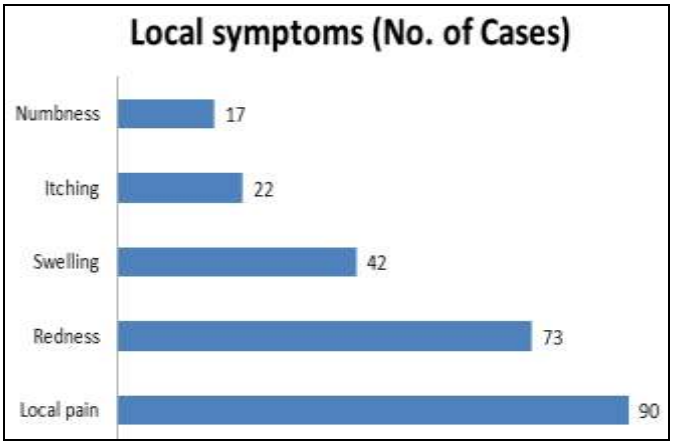

Fig 3: Local Symptoms

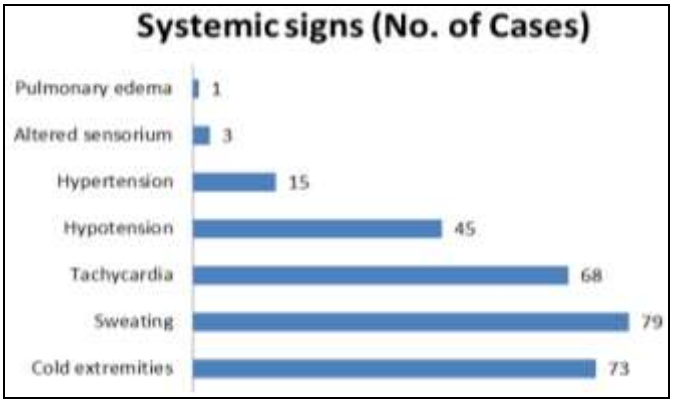

Fig 4: Systemic signs

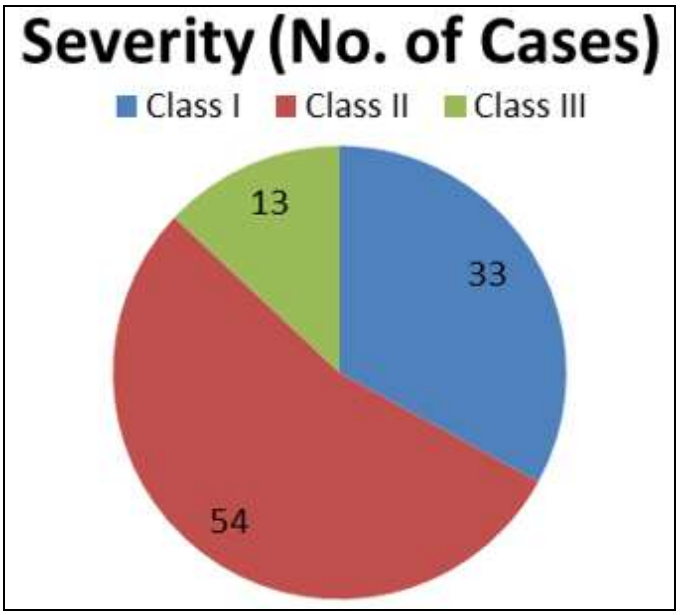

Fig 5: Severity

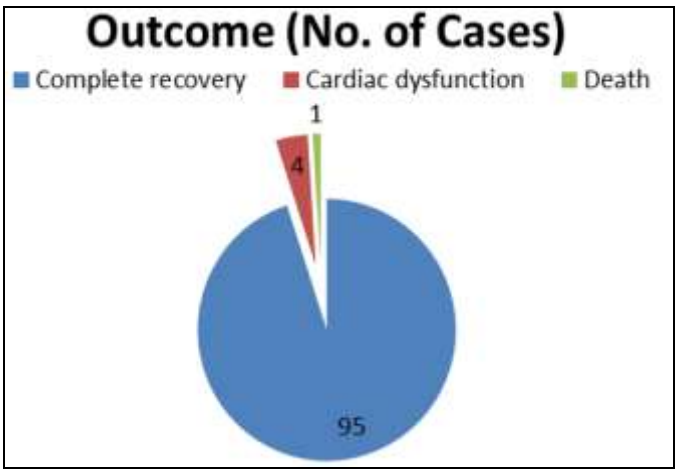

Fig 6: Outcome

Pain is the commonest symptom which ranged between within few minutes to hours. ECG helps in diagnosis of fatal conduction disturbance, ischemia and very importantly tachycardia is the commonest finding usually seen with in first 4 hours and may persist for 24-72 hours.

Scorpion sting envenomation is one of the common medical emergencies among children, especially in rural areas. In the present study, maximum number of scorpion sting among children has occurred in the age group of 1 to 5 years, whereas Pol R *et al*. reported 2-7 years as most involved group. Boys were stung more often girls. Similar findings were observed by other studies [7, 8]. This male predominance of scorpion sting may be due to higher inquisitive nature of boys and boys go outside more commonly than girls, especially during night.

There is higher incidence of scorpion sting in rural areas. This may be attributed to poor socio-economic status (children walking barefoot). Majority of the children the site of scorpion sting was lower limbs, which was similar to Pol *et al*, Bosnak *et al*. and Farhly *et al*. observations [7, 9, 10]. The local symptom of scorpion sting include pain at the site of sting (most common), followed by redness, swelling, itching and numbness. The common systemic signs include cool extremities, sweating, and tachycardia. Cold extremities were reported in majority of patients in their studies by Bawasker *et al*. and Biswal *et al*. [11].

Children who received steroid and antihistamines had a higher mortality than the cases who did not receive any treatment. Even in those who received prazosin when along with steroid and antihistamines had a significantly higher mortality, than those who did not receive any drugs before admission. Antihistamines and dexamethasone alone or in combination are known to potentiate the effect of catecholamine in CVS and CNS and worsen encephalopathy cases died in our study were of similar case situations.

Conclusion

In endemic areas of venomous sting clothing, beddings, shoes, package should be vigorously shaken out and checked for scorpion without blindly putting hands. The present study shows that children should have supervised every time. Early Hospitalization and administration of accurate dose of prazosin and closely monitoring the victim in intensive care unit will save many lives. Periodic training for peripheral doctors regarding management of scorpion sting should be arranged. Scorpion sting should be included in a regular medical teaching at least in tropical and subtropical countries.

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