To Study the Clinical Features, Course & Complications of Scorpion Sting In the Paediatric Age Group

Dr. Ujjwala Shirsath[1], Dr. Ganesh B. Misal[2],

Dr. Ramesh B. Kothari[3]

[1]Assiatant Professor, [2]Senior resident, [3]Professor & Head, Department of Paediatrics, DVVPF's Medical College & Hospital, Ahmednagar-414111.

Corresponding Author : Dr. Ujjwala Shirsath

E-mail : shirsathujjwala7gmail@.com

Address : Department of Paediatrics, DVVPF's Medical College & Hospital, Ahmednagar - 414111.

Abstract :

Background: Scorpion envenomation is an important public health hazard in tropical and sub-tropical regions. Envenomation by scorpions can result in a wide range of clinical effects, including, cardiotoxicity, neurotoxicity and respiratory dysfunction. Out of 1500 scorpion species known to exist, about 30 are of medical importance. India is a country where agriculture forms the infrastructure of the nation's economy. The majority of land is under green belts for cultivation or is occupied by dense forests. Increased deforestation in recent years have increased the exposure of the tribal and other people living in rural areas to various forms of wild life. This lead to increased incidences of various bites and stings. **Aim:** To study the clinical features, course, and complications of scorpion sting. **Methodology:** It was descriptive observational type of study, in which all the children admitted for scorpion sting in Our hospital during the study period of 11month and who met the inclusion and exclusion criteria were included. **Result:** Common physical signs noted were breathlessness, tachycardia and hypertension. Hypertension was noted in 31% of cases. Bradycardia was noted in only 4 patients (30.7%) at admission. Peripheral circulatory failure (PCF) was the commonest complication encountered in 3 cases (8.5%) and mortality was noted in 14.29% of cases. **Conclusion:** The Study concludes that early and effective prazosin therapy, good supportive care, close monitoring and management of complications can limit the resulting morbidity and mortality significantly.

Keywords: Scorpion sting, Prazosin, Occupational hazard

Introduction:

Scorpion envenomation is an important public health hazard in tropical and sub-tropical regions. Envenomation by scorpions can result in a wide range of clinical effects, including, cardiotoxicity, neurotoxicity and respiratory dysfunction. Out of 1500 scorpion species known to exist, about 30 are of medical importance. India is a country where agriculture forms the infrastructure of the nation's economy. The majority of land is under green belts for cultivation or is occupied by dense forests. Increased deforestation in recent years have increased the exposure of the tribal and other people living in rural areas to various forms of wild life .This has led to increased incidences of various bites and stings.[(1)]

Scorpions are found commonly in our country. Hence, scorpion stings Constitutes an important health hazard. They are specially quite common in the rural and coastal areas. In India, about 86 species of scorpions are found of which are only two are known to be poisonous.[(2)]

These are –

- Mesobuthustamulus (Red scorpion)
- Palamneusswammerdami (Black scorpion)

In Maharashtra, stings by the red scorpion are quite common in Konkan area and the dry districts of Ahmednagar and Aurangabad. Scorpion stings are relatively less hazardous in adults, but may lead to serious toxicity in children. Hence, it assumes so much clinical importance in children.

Various epidemiological factors play a major role in the incidence of scorpion sting, like the type of house in which the victim reside, as "Kuchcha" houses, which provide good hiding places for the scorpions, record more instances of stings.[(3)] Environmental factor like summer season also play in important role in the epidemiology. Other factors, which may determine the severity of envenomation, includes:

- Age of the victim
- Size of the victim
- Breeding time of the scorpions
- Number of stings
- Time interval between sting and initiation of treatment
- Season[(4,5)]

The effects of envenomation may range from mild local pain and swelling to severe systemic signs and symptoms due to " AUTONOMIC STORM" a result of excess secretion of catecholamines.[(6)]

The systemic manifestations may range from vomiting, profuse sweating, excess salivation, mydriasis, priapism, hypertension or hypotension, pulmonary odema, cardiac arrhythmias to disseminated intravascular coagulation, metabolic derangements (hyperglycemia, hypocalcemia), convulsions, coma and a shock like reported.[7]

The various manifestation of systemic toxicity depend on the species of the scorpion involved in the sting. The composition of scorpion venom also varies from species to species, regarding its chemical composition, severity and toxicity as well as its effect on man Mesobuthus venom is five times more potent than Palamneus venom.[8] The venom is acidic in pH and contain 5 distinct fraction on chromatography. The different toxins are responsible for varied manifestations, like one for pulmonary edema and other for hyperglycemia.[9,10]

Scorpion sting assumes such clinical significance because of

1. The mortality associated with it.(especially in children)[11]
2. The severe systemic toxicity associated with scorpion envenomation[12]
3. Decrease in mortality, which can be achieved with early intervention[13]
4. Availability of newer drugs like prazosin, nifedipine, insulin and anti-scorpion venom for management[14]

Methodology:

Source of data: All the children admitted for scorpion sting in our hospital. To verify the epidemiological factors leading to the scorpion sting and the factors predisposing to prevalence of scorpion sting in the community, we visited the places from where the cases of scorpion sting were reported.

Study period: 15 July 2011 to 15 June 2012

Inclusion criteria:

1. All the definite cases of scorpion sting in children up to 18 years of age, in which a scorpion was seen in the vicinity either by the patient or the parents, immediately after the sting.

2. Children with history of bite coupled with classic clinical manifestations of scorpion sting were also included in the study.

Exclusion criteria:

1. Cases of scorpion sting in patients > 18 years of age.

2. Unknown bites and cases where the clinical manifestation was not compatible with scorpion sting envenomation were excluded.

Study design: descriptive observational

Study protocol: 35 cases of scorpion sing, admitted to Our hospital were included in the study. On admission, a detailed clinical history, including the time of sting, symptomatology, details of treatment received before admission was taken. Further description of the scorpion and details about the circumstances leading up to the sting were obtained.

All the patients were subjected to a detailed clinical examination at admission and at frequent intervals thereafter, as was necessary in each case. Hourly monitoring of heart rate, respiratory rate, blood pressure, urine output, cardiovascular and respiratory status was done. Routine investigations like complete blood counts, peripheral smear, urine routine, bleeding time, clotting time, blood sugar and serum amylase levels, was done in all the cases. Chest radiograph was done in cases with evidence of myocarditis or pulmonary edema. Electrocardiography (ECG) and Echocardiography was done in cases with myocarditis and congestive cardiac failure. Computed tomography (CT scan) of the brain was performed in cases with neurological involvement. Severity of cases was graded as follows:

Grade I : Isolated pain

Grade II : Systemic manifestations

- Hypertension
- Sweating
- Vomiting
- Priapism
- Fever
- Shivering

Grade III : Life – threatening manifestation

- Cardiogenic shock
- Pulmonary edema
- Altered consciousness

All patients who were symptomatic, received a dose of prazosin (30 microgram/kg/dose), at admission. Children with peripheral circulatory failure were treated with prazosin, intravenous fluids, and intravenous diazepam (0.2 mg/kg). Prazosin was repeated every 4 hours, till peripheries became warm and urine output improved.

Myocarditis with congestive cardiac failure was treated with oxygen (0.5 - 2 L/min), maintenance IV fluids, prazosin 30 microgram/kg/dose (Nasogastric tube/oral) and Dobutamine infusion (5-15 microgram/kg/min). Pulmonary edema was treated with oxygen, prazosin, dobutamine infusions, furosemide and by mechanical ventilation when indicated. All the cases were closely monitored for complications and managed accordingly.

We visited' 32 places where' the cases-of scorpion stings' were-reported. This was done to obtain a firsthand knowledge of the habitats of scorpions and to verify the various epidemiological factors that predispose to a high prevalence of scorpion sting in our community.

Results :

Chart 1: Symptoms of Scorpion Sting

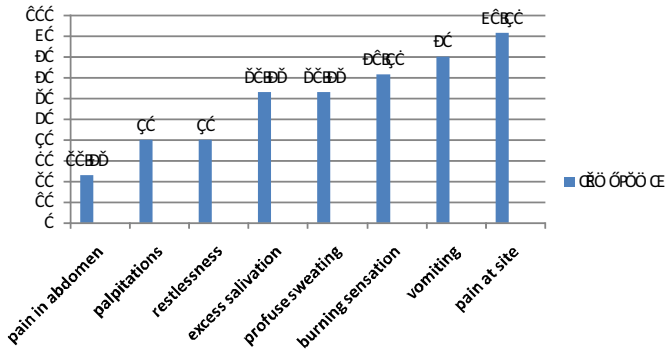

Chart 2: Signs of Scorpion Sting

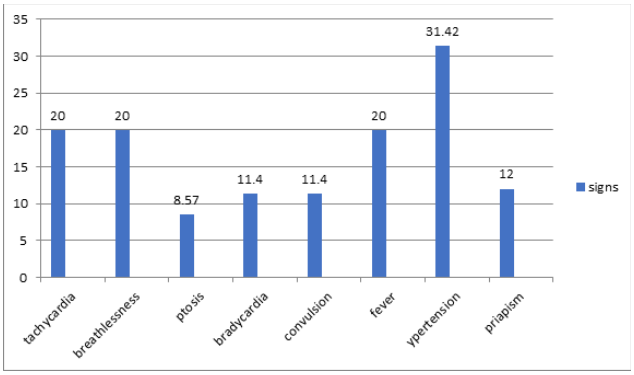

Table 1: Electrocardiography (ECG) findings

ECG Finding	Number	%
Sinus tachycardia	7	53.84%
ST-T changes	2	15.38%
Bradycardia	4	30.7%

Electrocardiography was done in all 35 cases, of which 13 shows abnormalities, with 53.84% cases shows sinus tachycardia

Table 2: Blood Pressure Findings in 35 cases

Blood Pressure	No. of cases	Deaths	Mortality %
Hypertension	10	1	2.8%
Normotensive	21	0	0
Hypotension	4	4	11.42%

100% mortality was noted in all hypotensive patients.

Table 3: Systemic Complications

Sr. No.	Complications	No of cases	Percentage
1	Peripheral circulatory failure	3	8.57
2	Myocarditis	5	14.2
3	Altered mentation	1	2.85
4	Pulmonary oedema	3	8.57

Discussion :

Symptoms: Pain at the site of sting was the commonest complaint noted and was invariably present in all the cases. The high incidence of pain was also noted in previous studies.[14] Other common symptom noted were profuse sweating, restlessness, vomiting and excessive salivation. Pain abdomen was a presenting symptom in 8 cases (22%). Pain was usually epigastric and non-spasmodic. The cause of abdominal pain is explained to be due to congested liver, pancreatitis or gastritis."**(Chart 1)**

Physical Signs: Common physical signs noted were breathlessness, tachycardia and hypertension. **(Chart 2)** Hypertension was noted in 31% of cases.**(Table 2)** Incidence of hypertension in scorpion stings in Indian studies, varies from 12.6% to 29% and hypertension is seen usually within 4-8 hours after the sting.[15] Hypotension can be occur within 1-2 hours after sting, due to fluid loss and also within 4-48hours, due to left ventricular dysfunction.**(Table 2)** Tachycardia was present in 53% of cases, while bradycardia was noted in only 4 patients (30.7%) at admission.**(Table 1)** Bradycardia is an early finding in 'Autonomic storm', due to cholinergic over activity and has been reported in 8 – 15% of cases.[16] Priapism was noted in 12% of cases and 3 of the cases developed myocarditis.

Complications: Complications were noted in 12 cases, with most of the complications being related to the effects of autonomic storm.**(Table 3)** Peripheral circulatory failure (PCF) was the commonest complication encountered in 3 cases(8.5%) and is a consequence of fluid loss in the initial cholinergic storm and also secondary to myocarditis. Most of cases of Peripheral circulatory failure responded well to prazosin, fluid resuscitation and inotropic support.[17]

Five cases (14.2%) landed up with myocarditis with consequent congestive cardiac failure. All the cases of myocarditis had ECG abnormalities in the form of ST inversion and/or T wave abnormalities.

Dysponea was complained by 7 patients (20%), 3 (8.57%) of them developed pulmonary edema. The reported incidence of pulmonary oedema secondary to scorpion sting in India is around 5%.[18] Although, a high incidence, similar to that seen in our study has been reported before, this could be due to species differences and delayed referral pattern seen in our cases. Both cardiogenic and non-cardiogenic factors have been implicated in pulmonary edema secondary to scorpion sting. One patient (2.8%) presented with altered sensorium

Mortality: 5 of the 35 study cases expired, giving a case fatality rate of 14.29%.**(Table 2)** Both the deaths occurred in younger boys and both had myocarditis, cardiogenic shock and massive pulmonary oedema. There was significant delay in seeking medical care and both the children had not received prazosin even after 24hrs of the sting. These victims could not be resuscitated in-spite of fluid boluses, oxygen and maximum inotrope infusion. The mortality due to scorpion string has dramatically declined over the years from up to 68% to less than 1%. Improved management practices and early administration of prazosin are the important factors responsible for the decline.[19]

Conclusion :

The role of scorpion antivenom still remains controversial. Public awareness regarding measures for prevention of sting and physician readiness to combat this common emergency can go a long way in preventing the devastating effects of this condition. However, anticipation and close monitoring for other uncommon complications is critical for effective management. Prazosin has revolutionized the management of scorpion sting envenomation.

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