Section: Pediatrics

Original Research Article

PEDIATRIC SCORPION ENVENOMATION: CLINICAL PROFILES, DEMOGRAPHIC PATTERNS, AND OUTCOMES IN A TERTIARY CARE SETTING IN INDIA

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Abstract

Background: In children, scorpion stings can lead to severe envenomation and a higher mortality rate than in adults. Timely administration of Prazosin and scorpion antivenom has shown efficacy in reducing mortality. This study aims to delineate the clinical and demographic profiles of scorpion stings in children less than 15 years and to identify factors contributing to poorer outcomes. **Materials and Methods:** Medical case records of children admitted between January 2020 to December 2022 in Pediatric Intensive Care Unit of Government Vellore Medical College and Hospital were retrieved and data recorded in pre-structured proforma. **Result:** The study included 97 children, among them 53 (54.63%) were male. The mean age was 6.07 (SD= ±3.37) years. The autonomic storm was observed in 57 (58.76%) cases. Of the total 97 children, 2 died (2.06%). Children seeking medical care after 6 hours of scorpion sting have been associated with severe form of envenomation and mortality. Priapism in boys is correlated positively with severe envenomation ($p < 0.0001$). **Conclusion:** Scorpion sting has a good prognosis with timely identification of complications and with good supportive care.

INTRODUCTION

Scorpion envenomation is a medical emergency and is associated with good outcome on timely intervention. Scorpion venom is a mixture of various substances like neurotoxic proteins or peptides, and inflammatory toxins like serotonin, hyaluronidase, histamine releasers and other cytokines.[1,2] Scorpion envenomation results in catecholamine storm and is responsible for the varied clinical features. The definitive treatment for symptomatic patients is administration of scorpion antivenom. Scorpion antivenom (SAV) neutralizes the effect of circulating venom and does not neutralize the effect of circulating catecholamines and cytokines. Prazosin is considered as the pharmacological antidote to scorpion envenomation and has reduced the mortality rate significantly. Studies have shown better outcomes with the usage of SAV along with prazosin than the use of SAV alone.[3–6]

Children present with more severe envenomation with a higher incidence of cardiopulmonary failure and a high mortality rate compared with adult population. In India scorpion stings are commonly reported in the states of Maharashtra, Karnataka, Tamil Nadu, Madhya Pradesh, Puducherry and Odisha. This study brings out the epidemiological characteristics of children with scorpion sting from places in and around Vellore district of Tamil Nadu.

Objectives

1. To describe the clinical profile and demographic pattern of children aged less than 12 years presenting with a history of scorpion stings.
2. To analyze the factors contributing to severe envenomation and poorer outcomes.

MATERIALS AND METHODS

The study is a retrospective observational study from January 2020 to December 2022. All children less than 12 years admitted with a history of scorpion sting in pediatric intensive care unit of Government Vellore Medical College and Hospital are enrolled in this study. Data are collected from the medical records department and no additional investigations or interventions are done for the purpose of the study. Data on epidemiology of the patients such as age, sex, timing of the sting, the time taken to seek medical care, treatment given in primary health care center and the time taken to reach referral center are collected. The clinical presentation, treatment

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received and the final outcome of the patient are collected in a pre-structured data sheet.

Ethical clearance from the institute's ethical committee has been obtained and no data on patient information is disclosed.

Statistical methods

Continuous variables are expressed as mean ± SD, and categorical variables are expressed as frequency. Pearson's chi-square is used for the comparison of categorical data between groups. For all tests, a p-value < 0.05 is considered statistically significant. Analysis of data is done using SPSS software (Statistical product and social services, Armonk, NY:IBM Corp).

RESULTS

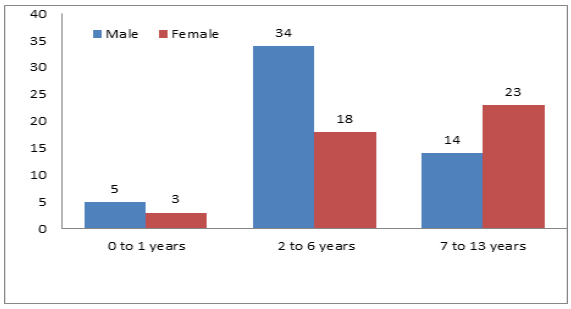

Figure 1: Age and sex distribution of children with scorpion sting

Ninety-seven children are enrolled in our study. Among them, 53 (54.6%) children are males and 44 (42.6%) children are females. Interestingly we find more female children 23 (62.1%) to be stung by scorpions in the age group of 7 to 13 years compared to children in the age group of 0 to 6 years where the male population 43 (71.6%) is found to be higher. The mean age of children with scorpion sting is 6.07 years with standard deviation of 3.37 years. The age and sex distribution of children with scorpion sting is shown in [Figure 1]. Most of the stings in children 65 in numbers (67%) are reported during morning hours 6 AM to 12 PM and evening hours 6 PM to 10 PM implying most of the stings occurred while children are playing out door. Lower limbs are the common site of scorpion sting 42 (42.3%) followed by upper limbs. Scorpion sting is commonly seen during summer season and rainy season in our study with more cases recorded in the months of April, May, July and August.

Pain is a universal finding. Fifty seven (58.76%) children have developed autonomic storm and the clinical manifestation are described in Table- 1. Forty (41.2%) children have been categorized in grade I envenomation with local swelling and pain. Grade II envenomation is seen in 41.2 % (n= 40) of children. Grade III and grade IV envenomation are seen in 12.4% (n= 12) and 5.2% (n= 5) respectively. The mean duration of hospital stay is 3.45 days. One child with grade 4 envenomation has developed critical illness associated encephalopathy requiring medical care for 48 days.

Out of the 97 children, 60 children have gone to Primary Health Care (PHC) Centers before coming to our institute with a mean time for reaching the PHC being 1.32 hours with a standard deviation of 3.14 hours. The mean time to reach Tertiary Care Centre is 4.16 hours, with a range between 30 minutes to 30 hours. The standard deviation to reach Tertiary Care Centre is 5.09 hours. We find in our study that of the 60 children who have gone to PHC, 55% children have received steroid (dexamethasone) or antihistamine (chlorpheniramine) or both which is not desirable.

Delay in seeking treatment is associated with more severe symptoms and found to be statistically significant by chi square test (p value= 0.021). However severe form of envenomation is not associated with the age or sex of the child. Priapism is positively correlated with severity (p= 0.0001). [Table 2]

Scorpion sting has a very good prognosis with timely intervention and good supportive care. In our institute 95 children are alive which accounts for 97.9% of the total scorpion sting cases. Two children have expired with case fatality rate of 2.06%. [Table 3] describes the salient features observed in non survivors.

Table 1: Clinical features of scorpion envenomation

Clinical findings	Frequency	Percentage
Autonomic storm	57 (n= 97)	58.76
Diaphoresis	49 (n=97)	50.5
Vomiting	22 (n=97)	22.7
Priapism	10 (n=53)	18.5
Tachypnea	28 (n=97)	28.9
Tachycardia	25 (n=97)	25.8
Bradycardia	03 (n=97)	3.1
Hypertension	17 (n=97)	17.5
Hypotension	11 (n=97)	11.3
Seizure	01 (n=97)	1.03
Coma	02 (n=97)	2.06

Table 2: Association between severity of envenomation and time to seek medical care

Time to medical care/ Grade 3 and 4	<6 hours	>6 hours
Yes	11 (13.6%)	6 (37.5%)
No	70 (86.4%)	10 (62.5%)
Total	81 (100%)	16 (100%)

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p value = 0.021.

Table 3: Characteristic features among non survivors

Age (years)	**9**	**9**
Sex	Male	Female
Time from sting to primary care	10 hours	7 hours
Time from sting to tertiary care	12 hours	9 hours
Shock on admission	Yes	Yes
Coma on admission	Yes	Yes
Dexamethasone use before referral	Yes	Yes
First dose of prazosin	10 hours	9 hours

DISCUSSION

We find the commonly affected age group is between 1 to 6 years with a percentage of 60.82%. Similar age group distribution has been described by Prasad et al and Bahloul et al.[7,8] Lower limbs are the common site of scorpion sting as seen in other studies. Though scorpions are nocturnal animals we find more stings are reported during day time when children tend to play outdoors. Children have characters like walking bare foot, playing in open ground and exploring all the nook and corner making them susceptible to scorpion sting during day time. Nocturnal bites are less commonly seen as children remain inside house under parental supervision. Male children (54.63%) are comparatively more exposed to scorpion sting than female children (45.36%) and similar findings are seen by Prasad et al and Baseer et al.[7,9]

Autonomic storm is seen in 58.76%. However Peripheral circulatory failure is found to be higher in many Indian studies, Kumar CM reported 72% of peripheral circulatory failure, 81.5 % by Bahloul et al.[8,10] The case fatality rate is 2.06% in our study. The mortality rate varies between 1 % and 10 % in varied studies.

Steroid has been stated to produce no beneficial effect and can be harmful in some research studies. Prasad et al and Bawaskar et al had described fatal outcomes with use of steroid(2,4,7). However steroid use and its association with severe envenomation is not statistically significant in our study (p value = 0.878). Similar observation is made by Bahloul et al between survivors and non-survivors.[8] Late identification of complication and late initiation of supportive care can be a possible explanation for adverse outcome in steroid group rather than the use of steroid alone.

The predictors of severe envenomation in our study are priapism, delay in seeking medical care, patient presenting in shock and coma. Similar results are reported by Prasad et al, Baseer et al and Bahloul et al.[7–9]

CONCLUSION

Continuous sensitization of physicians working in primary health centers about clinical features of scorpion envenomation and treatment modalities will help early identification of complications and early referral. Public awareness about complications of scorpion sting will motivate the people to seek early medical care. The surroundings should be kept clean where their children tend to play, shoes and bed should be checked for presence of any insects to prevent scorpion sting.

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