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Factors responsible for scorpion sting and assessment of complications and severity of scorpion sting in Children from Gaya, Bihar

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Abstract
Scorpion sting is very common in rural India and is the commonest envenomation in our hospital followed by snake bite. Mortality due to scorpion envenomation has now come down significantly with the use of Prazosin and other advances that is dobutamine for supporting the heart in severe cases. Based on the severity of the scorpion sting in children, the current study was planned to assess the clinical parameters as well as the complications observed after administration of the Prazosin.
The study was planned on the 50 children of age 1 -8 years having positive scorpion sting who were referred to Anugrah Narayan Magadh Medical College, Gaya, Bihar. At the time of admission, the patient's clinical history was recorded in prefixed proforma. The approval of the institutional ethics committee had been taken before the study. Informed consent was taken from parents.. The aim and the objective of the study was conveyed to all patients.
The present study revealed that scorpion sting envenomation is a common medical emergency among children. It is common in rural areas and among boys. The site of sting was predominantly in the lower limbs and during nights of summer season. Timely referral and early therapy with prazosin may be lifesaving. Hence care should be taken on childrens to prevent the scorpion sting. Also immediate medical treatment available will save the further complications.

Keywords: scorpion sting, childrens, Gaya, Bihar

Introduction
Most scorpion stings don't need medical treatment. But if symptoms are severe, children may need to receive care in a hospital. You may be given sedatives for muscle spasms and drugs through a vein (intravenously) to treat high blood pressure, agitation and pain. Scorpion stings are a cutaneous condition caused by the stinging of scorpions, usually resulting in pain, paresthesia, and variable swelling. The anatomical part of the scorpion that delivers the sting is called a "telson". Most scorpion stings vary from small swelling to medically significant lesions in severity, with only a few causing severe allergic, neurotic or necrotic reactions. Only two species of scorpions can inflict stings which result in death of normal healthy humans: the Israeli deathstalker (*Leiurus quinquestriatus*) and the Brazilian yellow scorpion (*Tityus serrulatus*). Antivenom exists for both species' stings.
The use of scorpion antivenom remains controversial because of concerns about effectiveness, side effects (more of a concern with older, less purified formulations), cost and access to care. Antivenom is most effective if given before symptoms develop, so children seen in remote rural emergency rooms, where access to medical centers and intensive care units is limited, are often treated with antivenom as a precaution. Also, if more-severe symptoms are present, then antivenom may be recommended [1].
Scorpions come in a variety of colors, shapes, and sizes. They often blend into their environment during daylight but will glow under a black light at night. The toxicity caused by a scorpion sting differs depending on the kind of scorpion involved. There are several areas of the world where scorpion stings cause serious toxicity. Fortunately, most of the scorpions found in the US are much less dangerous but they can still inflict painful stings. The pain occurs immediately and is often described as stinging or burning, although sometimes a tingling or numb sensation happens. Other possible effects at the sting site include redness, swelling, and a scab. The most dangerous species found in the US is the *Centruroides exilicauda* (formerly known as *Centruroides sculpturatus*), commonly called the bark scorpion. This species primarily lives in Arizona but can also be found in parts of California, Nevada, New Mexico, Texas, and Utah. In addition to causing a painful sting, the bark scorpion can sometimes cause abnormal muscle activity like muscle twitching, unusual eye movements, slurred speech, or difficulty swallowing and breathing. Agitation, high blood pressure, and changes in heart rate can develop. These effects usually happen quickly, can worsen over a few hours, and can last for several hours. Serious toxicity is typically limited to very young children. Death from a scorpion sting is very rare and has not been reported in the US for almost 50 years.
Treatment for all scorpion stings includes washing the site with soap and water. A tourniquet should never be used. Pain from scorpion stings can usually be managed at home with over-the-counter pain relievers. Initial management of a

scorpion sting at home is appropriate even if it is known to be a bark scorpion, but call Poison Control to help you through it. Pain that is not relieved with home treatment or the development of body-wide effects should be managed in an emergency room because prescription pain relievers, muscle relaxants, or other medications might be needed. Antivenom is available in the US to treat serious envenomation from *Centruroides* species, but life-threatening side effects can happen and it is very expensive and not stocked by many hospitals [2].

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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 [4].

Scorpion sting is very common in rural India and is the commonest envenomation in our hospital. Mortality due to scorpion envenomation has now come down significantly with the use of Prazosin and other advances in the care for these children. The usefulness of prazosin therapy in scorpion sting was scientifically established in mid-eighties by Bawaskar *et al*, which was later strengthened by many other investigators [5].

Based on the severity of the scorpion sting in the childs the current study was planned to assess the clinical parameters as well as the complications observed after administration of the Prazosin.

Methodology

The study was planned on 50 children of age 1 -8 years having positive scorpion sting referred to Anugrah Narayan Magadh Medical College, Gaya, Bihar. The period of study was from February 2018 to July 2018. At the time of admission, the patient's clinical history was recorded in prefixed proforma. The approval of the institutional ethic committee had been taken before the study. All the patients were informed consent. The aim and the objective of the study are conveyed to all patients.

Following is the Inclusion & exclusion criteria of the current study:

Inclusion Criteria: Children below 8 years of age reported with confirmed scorpion sting bite.

Exclusion Criteria: Children's admitted with unknown bite.

Data were extracted from the case records of children admitted with positive history of scorpion sting, with scorpion being seen or killed by relatives or bystanders. Data recorded for each case included: age and sex of the patient, site of scorpion sting.

Results & Discussion

The data from the Childs having scorpion stings were collected and presented as below. The data give the clinical observations as well as the complications observed after administration of the Prazosin were discussed as below.

Table 1: Clinical Observations

Observation	No. of Cases
Age	
1 – 3 years	22
3 – 5 years	18
5 – 8 years	10
Sex	
Males	35
Females	15
Site of sting	
Lower limbs	32
Upper limb	11
Trunk	5
Head and neck	2
Local symptoms	
Local pain	45
Redness	32
Swelling	20
Itching	9
Numbness	7
Systemic signs	
Cold extremities	36
Sweating	32
Tachycardia	31
Hypotension	21
Hypertension	9
Altered sensorium	2
Pulmonary edema	0
Outcome	
Complete recovery	47
Cardiac dysfunction	2
Death	1

Table 2: Complications observed after administration of prazosin

Complications	In less than hours	In 4-8 hours	In 8-12 hours
Peripheral circulatory failure	3	12	2
Myocarditis	0	1	2
Congestive cardiac failure	0	0	1
Pulmonary edema	0	0	0
Hypertension	0	1	0
Encephalopathy	0	1	0
Convulsions	1	0	0

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 0-5 years, whereas Pol R *et al*, reported 2-7 years as most involved group. (6) 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 socioeconomic status (children walking barefoot). The incidence of scorpion sting is more during summer than other season. Majority of the sting occurred during 6 pm to 12 am. This might be because of scorpions are active at night. 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*, 's observations [6-10].

Venom of the Indian red scorpion (M. tamulus) is a potent sodium channel activator, resulting in the stimulation of the autonomic nervous system, which in turn leads to the sudden release of endogenous catecholamines into the circulation [11]. The venom initially leads to a transient cholinergic phase, followed by sustained adrenergic hyperactivity, which is a venom dose–dependent phenomenon [5]. The clinical manifestations depend on the dose of th e venom, the age of the individual, the season of the sting, and the time lapse between the sting and hospitalization. The patients were admitted to our hospital with cardiogenic shock, respiratory distress, hypoxia, and pulmonary edema. All patients were reported after 6–18 h of scorpion sting as their condition deteriorated at peripheral hospital. For them, early prazosin medication was recommended to prevent pulmonary edema. Antivenom was not given to any of the patients without prior skin test. Treatment with steroids and antihistamines before admission was associated with poor outcome, but it was prescribed due to low side effect and absence of antivenom or latest facility.

Conclusion

The present study revealed that scorpion sting envenomation is a common medical emergency among children. It is common in rural areas and among boys. The site of sting was predominantly in the lower limbs and during nights of summer season. Timely referral and early therapy with prazosin may be lifesaving. Hence care should be taken on children to prevent the scorpion sting. Also immediate medical treatment available will save the further complications.

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