

Treatment in Scorpion Sting: Which is Correct?

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Abstract

Background: The scorpion sting is a condition that requires management in emergency department. Anti-allergic, analgesic and anti-venom administrations are commonly used, particularly in pediatric patients. In this study, it was aimed to present data from patients who presented with scorpion sting and underwent various treatments.

Material and method: We retrospectively reviewed 50 patients who presented to our hospital with scorpion sting. Demographic characteristics, severity of clinical presentation, treatments employed and anti-venom administration were evaluated. In patients underwent anti-venom treatment, we evaluated whether or not anti-venom caused systemic signs or additional pathology.

Results: Mean age was 9.88 ± 4.58 years in the study population. There were 18 girls (36%) and 32 boys (64%). It was found that electrocardiogram was performed in all patients and that there was sinus tachycardia in 6 patients (12%). No systemic sign was detected during follow-up. It was found that anti-venom treatment was used in only 7 patients (14%). No significant difference was detected between anti-venom treatment and other therapeutic modalities used in ED.

Conclusion: Scorpion sting is one of the leading causes of insect bites presenting to pediatric emergency departments in Turkey. It was observed that, even in tertiary care settings, anti-venom treatment is used in scorpion sting without systemic signs. Based on this study, no anti-venom indication was present in this patient group. Thus, anti-venom decision should be assessed by relevant unit or pediatric emergency clinicians in cases requiring anti-venom treatment. Unnecessary anti-venom use should be avoided by training clinicians in primary care.

Keywords: Scorpion; Anti-venom; Sting; Treatment.

Introduction

Scorpion bite is one of the leading causes of emergency department presentations due to

insect bite. Scorpion bite is more common in tropical regions.¹ The scorpion species in our country are generally non-toxic but scorpion bite is an important public health issue Aegean and Southeast regions where temperature is higher due to climatic characteristics.² Of 23 scorpion species found in Turkey, 8 were toxic. Among these, *Leiurus abduhbayrami* (Yellow scorpion) and *Androctonus crassicauda* (Black scorpion) are extremely toxic and lethal. The Yellow scorpion can be encountered at the western areas of Southeast Anatolia region while Black scorpion at East Anatolia, Southeast Anatolia and Eastern Mediterranean regions.³ The most common species is *Mesobuthus gibbosus* (Anatolian yellow

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scorpion) in Anatolia. Its venom can be lethal, particularly in children.⁴

Although majority of scorpion stings lead only localized pain without threatening life, one-third can cause intoxication resulting in dead. Children are more vulnerable to scorpion venom. The severity of scorpion sting depends on presence of neurotoxin in the venom. The neurotoxin causes acute release of neurotransmitters from autonomic nervous system, particularly from sympathetic system. In addition, a potent inflammatory response has direct influence on several vital functions including cardiovascular, respiratory and neuromuscular systems, resulting in worsening of symptoms.⁵

Materials and Methods

We retrospectively reviewed 50 patients presented to Kayseri City Hospital with scorpion sting between July, 2018 and October, 2019 and treatments employed in these patients. In all patients, complete blood count, ECG, coagulation assays, muscle enzyme levels, systemic signs and anti-venom administration were evaluated. The patients were assigned into two groups according to presence of neurological signs. The patients

with preponderance of neurological signs were classified into 4 stages: Stage 1, localized pain and paresthesia; Stage 2, proximal progression of pain and paresthesia; Stage 3, cranial nerve involvement or somatic neuromuscular dysfunction; Stage 4,5 cranial nerve involvement together with somatic neuromuscular dysfunction. Again, the patients with preponderance of neurological signs were stratified as mild, moderate or severe: mild, localized signs; moderate, localized signs with progression to proximal and/or mild systemic signs; severe, life-threatening systemic signs. It is considered that anti-venom is indicated in cases with Stage 3 and 4 disease.⁶

Statistical analysis

Statistical analyses were performed by SPSS version 22.0. Categorical variables are presented as count (%). Chi-square test was used to assess categorical variables. A p -value <0.05 was considered as statistically significant in all analyses.

Results

There were 18 girls (36%) and 32 boys (64%) in our study. Mean age was 9.88 ± 4.58 years. Figure 1 shows age distribution in the study population.

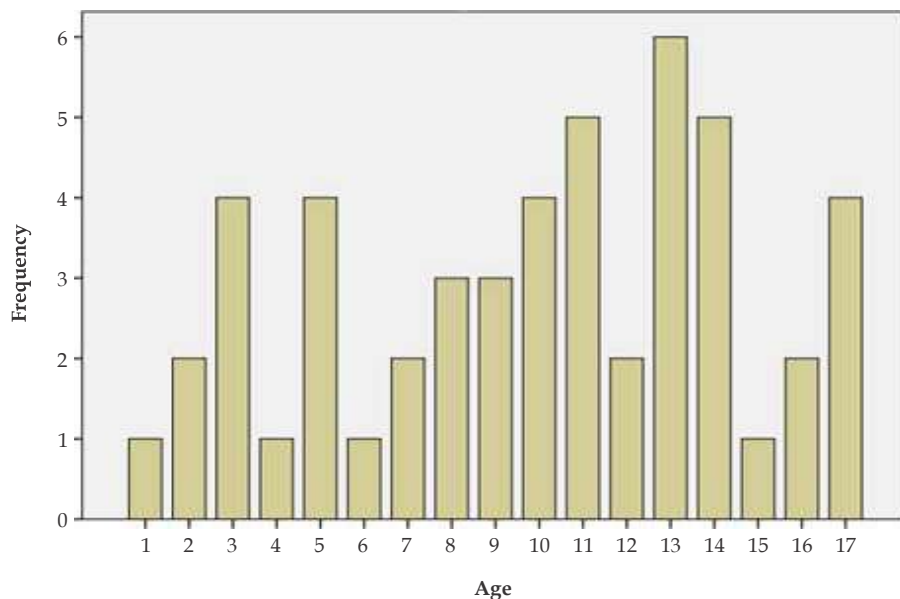


Fig. 1: Age distribution.

In all patients, complete blood count, ECG, coagulation assays, muscle enzyme levels, systemic signs and anti-venom administration were

evaluated. There was no abnormal hemogram, biochemistry parameters. It was found that electrocardiogram was performed in all patients

and that there was sinus tachycardia in 6 patients (12%).

No systemic sign was detected during follow-up. It was found that anti-venom treatment was used in only 7 patients (14%).

The treatment modalities used at presentation to ED were classified as anti-allergic plus analgesic, analgesic and other treatments. Anti-venom administration (whether or not) was assessed using chi-square test; however, no significant difference was found ($p = 0.125$). Table 1 presents demographic and clinical characteristics of study population.

Table 1: Demographic and clinical characteristics

Variable	Mean \pm SD or n (%)
Gender	
Male	32 (64)
Female	18 (36)
Age	9.88 \pm 4.58
ECG finding	
Positive	6 (12)
Negative	44 (88)
Treatment modalities	
No treatment	2 (4)
Anti-allergic	18 (36)
Analgesic	17 (34)
Other	13 (26)
Anti-venom	
Given	7 (14)
Not given	43 (86)

Discussion

Although majority of scorpion species in our country are known to be non-toxic, several treatment modalities are used at presentation to pediatric emergency department. The severity of clinical presentation should be considered during decision-making about treatment modalities. Staging is guiding for identifying clinical severity.

Local cold compresses are applied if there is pain at wound site. It is more effective when applied within 2 hours. It relieves pain and decreased passage of venom into systemic circulation via local vasoconstriction. In our study, local compresses were used in 14% of patients.

Venom absorption can be delayed by fixing bite site below heart level. In our cases, it was seen that no such order was given.

As increased heart rate and blood pressure facilitate venom spread, the patient should be calm

down in order to maintain heart rate and blood pressure within normal range. However, it seems not possible to employ this measure given the patient volume in pediatric emergency department.

The most common symptom is local pain at wound site in scorpion bite.⁶ If pain is severe, oral or intramuscular analgesic can be used. In our study, analgesics were used in 34% of patients. A topical anesthetic can be applied in order to reduce localized paresthesia. In our study, topical anesthetics were used in 2 patients.

In a study comparing pain medication for scorpion sting, Aksel et al. found that topical lidocaine administration significantly decreased pain when compared to cold compress plus paracetamol.⁷ Tetanus prophylaxis was considered in 3 patients; however, 2 of these patients were on routine vaccination program and no additional vaccination was performed.

The prazosin use can be life-saving in cases with sympathetic signs such as tachycardia, pallor-cold in hands and feet, hypertension, hypersalivation or sweating. It acts by blocking sympathetic hyperactivation. It also activates potassium channels inhibited by venom. In addition, it reduces blood pressure without affecting heart rate. It must be used in all cases with signs of autonomic storming; however, it should not be used in patients having pain but no other sign. In our study, none of the patients received prazosin. The scorpion anti-venom can be given to severe patients with systemic signs. The effectiveness of available anti-venom is controversial as a specific treatment in scorpion sting. Although it is recommended that anti-venom can be used in the presence of systemic signs and symptoms, one should be careful during and after anti-venom administration as standard anti-venom can cause anaphylaxis and serum sickness.⁸

In our study, it was found that scorpion anti-venom was given to 7 patients despite lack of systemic signs. In a study on adult patients in 2018, high rate of anti-venom use was detected in the absence of indication.⁵ In a study from Çukurova region, 189 patients were retrospectively reviewed between 2007 and 2013. It was found that scorpion anti-venom was given to 18 of 88 patients with Stage 1 disease although systemic symptoms were lacking.⁹

In our study, the finding that there was no significant difference between anti-venom administration (whether or not given) and other treatments in ED were attributed to fact that there was no anti-venom indication as the patients were

considered as mild or Stage 1 disease. Again, in an adult study by Şahin et al., it was shown that anti-venom was used without indication in scorpion stings.¹⁰

Conclusion

In this study, it was found that anti-allergic and analgesic agents were commonly used in the treatment of scorpion sting presented to pediatric emergency department. In addition, it was seen that there was considerable anti-venom use. As it is known that anti-venom itself can cause severe allergic reactions such as anaphylaxis, we intended to emphasize that anti-venom should not be used unless there is an appropriate indication.

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