AKADEMİK ACİL TIP DERGİSİ

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Epidemiological, Clinical Characteristics and Outcome of Scorpion Envenomation in Batman, Turkey: An Analysis of 12O Cases

Batman'da Akrep Sokmalarının Epidemiyolojik, Klinik Özellikleri ve Sonuçları: 120 Vakanın Analizi

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ABSTRACT

OBJECTIVE: Scorpion envenomation is common in and around Batman. The aim of this study is to describe the circumstances and clinical effects of stings in south east of Turkey scorpions.

MATERIAL AND METHODS: One hundred and twenty patients with scorpion sting were collected prospectively from presentations to emergency departments of Batman State Hospital from March 2007 to October 2007. The following information were prospectively recorded: demographics, circumstances of the sting, sting site, local and system ic effects, vital signs, past medical history, and the presence of shock

RESULTS: 120 patients (75 females and 45 males), with a mean age of 33.6 ±15.1 (range 16-80) were included in the study. The majority (36.7%) of stings occurred between 0600 and 1200. Of stings, 61.7% occurred indoors. Of cases, 41.6% were stung while they were working. The most common region (27.5%) stung by scorpions was hand-fingers. The most common symptom occurred in cases was immediate localized pain (97.5%), and was severe in 70 cases (58.3%). Other local effects included red mark/redness (65%), tenderness (40%), numbness (51.7%) and edema (25.8%). Sweating was the most common minor systemic effects that occurred in 16.7% of cases. Cardiac dysfunction, myocardial damage and deaths secondary to major systemic envenoming were not determined in any patient.

CONCLUSION: Scorpion stings occurred in and around Batman region do not appear to cause severe or life-threatening effects. Most stings occurred indoors and at midday. Hand-fingers were the common body section that was stung. Females were mostly stung by scorpions.

Key Words: Female; Hand-fingers; Indoor; Pain; Scorpion sting

ÖZET

AMAÇ: Akrep sokması Batman ve çevresinde yaygındır. Bu çalışmanın amacı, Türkiye'nin güneydoğusunda Batman'daki akrep sokmalarının durumlarını ve klinik etkilerini tanımlamaktır.

MATERYAL VE METOD: Mart 2007'den ve Ekim 2007'ye kadar Batman Devlet Hastanesi acil servisine olan başvurulardan akrep sokması olan 120 hasta ileriye dönük olarak derlendi. Aşağıdaki bilgiler ileriye dönük olarak kayıt edildi: Demografik, akrep sokmansın durumu, sokma bölgesi, lokal ve sistemik etkiler, vital bulgular, tıbbi özgeçmiş ve şok varlığı.

BULGULAR: Çalışmaya yaş ortalaması 33.6 ±15.1 olan 120 hasta (75 kadın ve 45 erkek) dâhil edildi. Akrep sokmaların çoğunluğu (%36.7) 0600 ve 1200 saatleri arasında meydana geldi. Sokmaların %61.7'si evin içinde meydana geldi. Vakaların %41.6'sı elbise giyerken sokuldu. Akrepler tarafından en çok sokulan bölge el parmakları idi. Vakalarda en çok meydana gelen semptom ani localize ağrı (%97.5) idi ve 70 hastada (%58.3) ağrı şiddetli idi. Diğer local etkiler kızarıklık (%65), duyarlılık (%40), uyuşma (%51.7) ve ödem (%25.8) idi. En yaygın minor etkiler hastaların %16.7'sinde meydana gelen terleme idi. Hiçbir hastada, major sistemik zehirlenmeye bağlı kardiyak fonksiyon bozukluğu, miyokard hasarı ve ölüm tespit edilmedi.

SONUÇ: Batman ve çevresindeki bölgede oluşan akrep sokmaları ciddi veya hayatı tehdit edici etkilere neden olmamaktadır. Akrep sokmaların çoğu ev içinde ve gündüzde meydana geldi. Vücudun en çok sokulan bölgesi el parmakları idi. Kadınlar erkeklere göre daha çok akrepler tarafından sokuldu.

Anahtar Kelimeler: Ağrı; Akrep sokması; El parmakları; Ev içi; Kadın;

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INTRODUCTION

The scorpionism and its consequences are an actual public health problem in several parts of the world [1,2]; especially in north-Saharan Africa, Sahelian Africa, South Africa, Near and Middle-East, South India, Mexico and South Latin America, east of the Andes [1,3-6]. Approximately 1500 species of scorpions are described. About thirty of them are recognized as potentially dangerous for humans [7,8]. The Buthidae families are the most toxic offender. Approximately 94% of the accidents occur during the night at homes especially in rural areas, and 88% do not require any hospitalization [6,9,10]. Climatic conditions, dryness and heat, are also important risk factors [11]. The effects of the stings depend on the delivery dose of the scorpion, the age of the offender, the season, and the size of the victim [12]. Thanks to the antivenom therapy and to supportive treatment, could decrease the effects significantly. About 40% of the scorpion stings are treated exclusively with traditional medicine, 27% by both the traditional and modern medicines, 28% by modern medicine alone, and 7% remain without treatment [13].

Medically significant scorpion stings are almost universally characterized by intense local pain, usually without local tissue injury. Systemic effects occur in a smaller proportion of scorpion stings, depending on scorpion species involved and are caused by a variety of excitatory neurotoxins [14]. Adults and among them males are most frequently stung by scorpions. However, envenomations are more severe in children in whom mortality is dramatically higher than in adults [10,15,16, 17-20]. The death can occur early due to cardiovascular collapse. The incidence is underestimated resulting in the absence of exhaustive report of the cases; mortality is probably better known. More than 1,200,000 scorpion stings occur annually while the number of deaths could exceed 3250 [7]. Average case fatality rate is 0.27% [7]. The most common poisonous scorpions species found in south and southeast of Turkey are Androctonus crassicauda ve Leiurus quinquestriatus [21,22].

PATIENTS AND METHODS

One hundred and twenty persons (older than 16 years old) admitted to emergency department of Batman State Hospital, Turkey, due to scorpion envenomation. Subjects were recruited prospectively over an 8 months period from March 2007 to October 2007. The following information was prospectively collected: demographics (age, gender, and geographical location), circumstances of the sting (location, time, date, activity at the time), and sting site, local and systemic effects (onset, duration, and severity), vital signs (heart rate, respiratory rate, systolic and diastolic blood pressure), past medical history, and the presence of shock (systolic blood pressure [SBP] less than 90 mmHg or decrease in SBP greater than 40 mmHg).

The chest roentgenograms and 12-derivated electrocardiography were performed on admission. The following biochemical parameters measured on admission were also collected: arterial pH, arterial oxygen tension (PaO2), arterial carbon dioxide tension (PaCO2), arterial oxygen saturation (SaO2), creatine phosphokinase (CPK), aspartate aminotransferase (AST), alanine aminotransferase (ALT), troponin I, CKMB and blood urea nitrogen. The diagnosis of pulmonary edema was based on the presence of clinical and radiological features of cardiogenic pulmonary edema and on the presence of arterial hypoxemia. A local ethics approval was obtained from the government of Batman State Hospital.

The patients were monitored after their history and physical examination. At admission, the patients received a single or two 5ml scorpion polyvalent antivenom ampoule (Refik Saydam Hygiene Center, Ankara, Turkey) depending on the severity of toxicity (local lymph node tenderness, incoagulable blood or neurotoxicity, tachycardia, sweating, short breathing, palpitation, nausea, vomiting, severe pain **(that was reported by patients),** hypotension with diastolic blood pressure < 60mm Hg or hypertension with systolic blood pressure >155mm Hg). Polyspecific antivenom was diluted to a total volume of 100 mL and infused intravenously over 20 min. Promethazine (12.5 or 25 mg intravenously) was given as prophylaxis against the adverse reaction of antivenom. Patients were examined at least every 6 h for the first 24 h and daily thereafter. Biochemical investigations were repeated 24 h later. The patients who had hypertension were treated with sublingual captopril. Tenoxicam (Oksamen-L® 20 mg Mustafa Nevzat, Turkey) was performed to the patients who had mild and severe pain.

Statistical analysis

For all statistical analyses, the software SPSS 13.0 for Windows was used. Continuing variables, average ± standard deviations and exact data was shown in percents. The comparison between the variables was made by using the Pearson Correlation Test. Being $p<0.05$ was deemed to be statistically meaningful.

RESULTS

A total of 120 subjects were recruited during the 8 month period. Of victims, 62.5% (n=75) were females, and 37.5% (n=45) were males with a mean age of 33.6 ±15.1 (range 16-80 years old). The majority of (78%) stings occurred in the warmest months (July and August) throughout Batman. Of stings, 25.8% occurred between 24^{00} -06^{00}, 36.7% between 06^{00} -12^{00}, 20% between 12^{00}-18^{00}, and the rest (17.5%) occurred between 18^{00}-24^{00} o'clock. Seventy-four (61.7%) stings occurred indoors (balcony bathroom, kitchen, sitting room, bed). The majority (35.1%) of stings indoors occurred in bed *(Table)*. Most of victims were stung by scorpions while they were working actively (41.7%) and sleeping (23.3%) in beds. The circumstances of the other stings were clarified in table with their rates.

Of offender scorpions, 86 were black and 34 were yellow. Ninety-nine (82.5%) of patients killed the offender and brought them together with. Thirty-eight victims tied their stung extremities with a cord to keep the venom of scorpions at distal.

Stings occurred to all parts of the body, with 47.5% upper extremities (hand and arm), 44.2% on the lower extremities (leg, foot wrist and finger), 5% on the trunk, and 3.3% on the head/neck *(Table)*. The median duration of effects was 4 h (IQR: 1–18 h).

Pain occurred in 97.5% of stings, was mild to moderate in 50 cases (41.7%) and severe or in 70 cases (58.3%), with a median duration of 5 h (IQR: 2–12 h). The most common signs without pain were redness or a red mark (65%), numbness (51.7%) and swelling/edema (25.8%). The other signs were explained in *Table*. Systemic effects that occurred in victims were including nausea-vomiting (13.3%), headache (6.7%), sweating (16.7%), chest pain (7.5%), and stomach (4.2%). Six patients (5%) were stung from two different location of their body by the same scorpion, while 114 (95%) were stung from only one location. There were no cases of hypersensitivity reactions, cardiogenic shock and pulmonary edema. The most common electrocardiography sign was tachycardia (17%). First aid or treatment was applied in 87 of the 120 cases (72.5%). The commonest treatment was analgesia, ice or cold pack and scorpion antivenom. All patients were discharged with recovery.

Table

	n	%
Place for sting		
Barn	2	1,7
Garden	19	15,8
Balcony	12	10,0
Bathroom	6	5,0
Flat roof	3	2,5
Kitchen	10	8,3
Sitting room	20	16,7
Field	22	18,3
Bed	26	21,7
Part of body stung		
Foot wrist	14	11,7
Foot finger	11	9,2
Leg	26	21,7
Head	1	0,8
Neck	3	2,5
Hand finger	33	27,5
Trunk	6	5,0
Arm	24	20,0
Thigh	2	1,7
The activity while being stung		
While working	50	41,7
While dressing cloths	12	10,0
While sitting	6	5,0
While sleeping	28	23,3
While eating meal	6	5,0
While bathing	2	1,7
While walking	16	13,3
Signs		
Edema	31	25,8
Mark/redness	78	65
Purples	9	7,5
Vomiting	16	13,3
Sweating	20	16,7
Pain	117	97,5
Numbness	62	51,7
Stomach	5	4,2
Chest pain	9	7,5
Headache	8	6,7
Dizziness	7	5,8

DISCUSSION

The patients <16 years of age were not accepted to our hospital (Batman State Hospital, Turkey); they were treated in Batman Children Hospital. So, the patients <16 years of age were dismissed from the present study. Scorpion envenomation is common in tropical and subtropical regions, Scorpion sting may cause discomfort and serious health problems; ranging from pain, bleeding disorders [23], neuropsychiatric manifestations including mental abnormalities [24], cerebral edema, seizures [25] stroke [26] paresthesia, and paralyses [27] allergic reactions, anaphylaxis [28], infections including infective endocarditis [29] toxidrome syndromes and also hypertension, myocardial ischemia, and pulmonary edema [24,30,31] by means of different toxins and mechanisms.

The symptomatology of scorpion envenomation is polymorphous. Bouaziz et al. stratified patients into three grades of severity at baseline, according to the absence or presence of systemic manifestations [32]. Grade I included patients who had only localized manifestations of scorpion sting; grade II included patients who also had systemic manifestations and grade III included patients with cardio-respiratory manifestations, mainly cardiogenic shock and pulmonary edema or severe neurological manifestation (coma and/or convulsion). In our study, all of patients had only localized manifestations (grade I). In Bouaziz et al study, 61.5% of patients had a pulmonary edema, while 20.5% patients had a cardiogenic shock [32].

The main clinical features of scorpion envenomation are localized reactions that occur in up to 97% of affected people; systemic manifestations (e.g., fever, sweating, hypertension, vomiting) are uncommon (3%) [4]. Cardio-respiratory manifestations, mainly cardiogenic shock and pulmonary edema, are the leading causes of death after scorpion envenomation. Almost 40 000 stung patients are recorded in Tunisia each year; 1000 of these have systemic manifestations requiring admission to hospital, of whom about 10 patients die [4,33,34]. Neurological manifestations are considered as an indicator of the severity of scorpion stung. These signs are observed at 2/3 hospitalized patients [4,33,35]. These manifestations are variables, going from the

simple hyperthermia and muscarinic syndrome [18] to severe neurological manifestations (coma and/or convulsions, like myosis, mydriasis, anisocoria, nystagmus, squint and erratic eye movements) [18,36,37]. In Bouaziz et at study, 22% of patients developed consciousness impairments, 15.4% had a coma [32]. In our study, without a small rate of headache (6.7%) and dizziness (5.8%) we did not fixed any neurological manifestations else. The frequency of hyperthermia was reported from 22–53% [38,39]. In the severe cases hyper sweating, myoclonias, agitation, and priapism can be observed [4,18,40]. In Bouaziz et al study, agitation and priapism were observed in more than 70% of cases, while myoclonias were noticed only in 11% of cases. In our study, only sweating (16.7%) was observed in signs mentioned above. The incidence of gastrointestinal manifestation varies from 11% to 100% according to the type of the scorpion and age of the patients [37,41,42]. They are relatively more frequent in children than in adult patients [37]. In Bouaziz et al study, almost 74% of their patients have experienced gastrointestinal manifestations on admission [32]. The most observed clinical manifestations are vomiting [37], diarrhea, hypersalivation, gastric distension, and dysphagia [43]. Hematemesis and a melena are rarely observed [44]. More rarely, scorpion envenomation can lead to acute pancreatitis [45]. In our study, no patient with severe gastrointestinal manifestation was assessed. Just only vomiting (16.7%) and stomach (4.2%) was observed.

n Jahan et al study, 49% of the scorpion stings were caused by black scorpions, and 38% by yellow scorpions, while rests of the stings (13%) were reported as caused by others [46]. No death due to scorpion stings was reported during the study period among 6465 patients. In our study, of offender scorpions, 70.1% were black and the rest (29.9%) were yellow; and no death occurred. Male/female ratio was reported as 1.9/1 in Jahan et al study. The cases among males were almost double that of females, a finding similar to the reported ratio from another study in Saudi Arabia, in which male to female ratio was 2.6/1 [47]. Pardal et al also reported the majority (83.3%) of victims as male in Brazil [48]. On the contrary, it was reported in two different studies made in USA and Australia that the females were stung more frequently then the male [9,49]. Our study supported these results; female/male ratio was 1.8/1. Different studies have shown varied age distribution for scorpion stings. Pardal et al reported the mean age of scorpion sting cases in Brazil as 33.6±18.3 [48]. This value of mean age is similar to the average age of the cases in our study (33.6 ±15.1). In Qassim, Saudi Arabia, the mean age was reported smaller (23.1 ±16.8) [46]. Another study on scorpion stings in Mexico reported that 77% of all accidents occurred among persons less than 30 years of age [1]. This proportion is higher than the finding (53.3%) in our study. A hospital-based study from the Kingdom of Saudi Arabia mentioned that ages in scorpion sting cases ranged from 2 months to 101 years and 70.6% of the cases were under 20 years of age [47]. Soulaymani-Bencheikh et al reported 36% of the cases in Morocco, being under 15 years [50]. In contrast, Nunes et al reported most victims in Brazil, to be 50 years of age or older [51]. In our study, the proportion of patients, to be 50 years of age or older was 16.7%; of all patients 25% were between 16-20 years of age.

Majority of the studies have mentioned increased reporting of scorpion sting cases during summer season as compared to winter, which matches with the findings in different studies [46,47,52,53]. In Texas, Scorpion stings were most frequently reported in May and June [9]. The majority of stings occurred in July and August in our study; but our study comprises only a period of 8 months. Geoffrey et al made a prospective study in Australia [54]. In this study, of scorpion stings 71% occurred at night, 86% occurred indoors, 15% occurred in bed, and 14% occurred while the patients were dressing. In our study these values were 43.4%, 61.7%, 35.1%, and 10% respectively. The majority of stings (60%) occurred at distal parts of extremities in Geoffrey et al study [54]. This ratio was higher than the finding in our study (36.7%). The first three common signs were redness/a red mark (66%), pain (49.5%) and tenderness (35%) in Geoffrey et al study [54]. The majority systemic effects observed were nausea, headache and malaise in this study. In our study pain, redness/a red mark and numbness were the most common signs. **Our study was made within a short period and in a narrow area; it did not included children and the species of scorpion were not identified. These conditions were the limitations in present study.**

As a conclusion, females were more frequently stung by scorpions. The majority stings occurred indoors and occurred while the victims were dressing. Distal parts of extremities were the most common origin that was stung by scorpions. Scorpion stings in and around Batman region do not appear to cause severe or life-threatening effects. Acute pulmonary edema and cardiac tamponade was not developed in any patients. All patients were discharged without complications.

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