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Epidemiological and clinical data of patients with stings and bites at a medical center of Turkey

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ABSTRACT

Objective: To analyze the epidemiological and clinical data of patients who were admitted to İnönü University Turgut Özal Medical Center Emergency Department with bites and stings between 2013 and 2015.

Methods: Patients with bites and stings who were admitted to İnönü University Turgut Özal Medical Center during 2013-2015 were selected for this retrospective evaluation. We retrieved the following information including age, gender, anatomic localization of the sting or bite, admission time, complaints, vital signs, length of stay, laboratory findings and hospitalization department. Pearson's *chi*-square test, Fisher's exact test, One-way ANOVA test and the Bonferroni correction as post hoc were used for statistical analysis.

Results: The mean age of the patients was (43.51±16.90) years, and 55% were male. The most common admission reason was pain (34.7%), followed by rash (19.1%) and panic (11.6%). A total of 16.8% of the admissions occurred in July, 16.8% in August and 16.5% in June while the occurrence was the lowest in November with 1.5%. The most prevalent bites or stinging animals were scorpions (34.6%), followed by ticks (19.7%) and bees (12.9%). Antihistaminic-steroid-tetanus and analgesic-antihistaminic-steroid combinations were administered, respectively to 59.6% and 25% of the patients. The longest length of stay was (48.56±26.92) h due to snake bites.

Conclusions: The community should be educated about the living areas of these animals, the seasons and hours in which they are active. Since individuals living and working in rural areas are at risk, more education should be given to them.

1. Introduction

Stings and bites due to poisonous and non-poisonous animals are important causes of emergency visits in our country, especially in the summer[1-3]. These animals usually do not pose a threat to

humans. They attack people to defend themselves. For children, patients over the age of 65 and patients with comorbid diseases, the bites could cause serious life hazards. In most of these bites and stings cases, symptoms such as pain, paralysis, edema, ecchymosis

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and swelling in the affected extremity can be observed depending on the bitten region; dizziness, nausea, vomiting, chest pain, cardiac and respiratory failure symptoms may also occur. Toxins can destroy cells by activating free radicals in the body. The microorganism due to bite may cause clinical symptoms. Disorder in the balance of the destruction and formation of free radicals also occur. The imbalance results in an increase in oxidants resulting in oxidative stress. As a result of the molecular destruction, many organs such as the heart, kidneys or liver can undergo damages. It can also alter the body metabolism by leading a disturbance in the ion channels[4-7].

The aim of this study is to analyze the epidemiological and clinical data of the patients with bites and stings who were admitted to İnönü University Turgut Özal Medical Center emergency department between 2013-2015.

2. Materials and methods

This is a retrospective study, including patients with sting and bites who were admitted to Turgut Özal Medical Center Emergency Department between 2013-2015. For this study, Ethics Committee's approval was obtained from Inonu University Faculty of Medicine Department of Academic Emergency and İnönü University Scientific Research and Publication Ethics Board (Verdict No: 2016/4-11).

A total of 544 patients with complaints of bitten or stung were selected. Four patients could not be included as their file information could not be reached. Thus, the data of 540 patients were included in the study. The age, gender, anatomical localization of the bite or sting, hospitalization time, complaint, vital signs, length of stay, hospitalized department and the laboratory findings were collected.

The IBM SPSS 22.0 program was used for data analysis. Qualitative variables were expressed as number (*n*) and percentage (%), and quantitative variables as mean \pm standard deviation. Pearson *Chi*-square test, Fisher's exact test, One-Way ANOVA test were used and Bonferroni analysis was used as post hoc. A value of $P < 0.05$ was considered as significant difference.

3. Results

The sociodemographic characteristics are shown in Table 1. The average age was (43.51 ± 16.90) years, and 55% were male.

More than half of the patients were admitted to the emergency department due to scorpion, followed by tick and bee sting (Table 2).

A total of 34.7% of the patients had pain, 19.1% had redness, 11.6% had panic, 10.7% had pain and swelling, 6.4% had fainting sensation and numbness, 4.6% had nausea and vomiting and 12.9% of them had all these complaints.

A total of 16.9% cases occurred in July, 16.5% in June, 16.8% in August, 13.2% in May, and 9.6% in September. Most patients

(31.8%) were admitted to the hospital between 18:00-24:00, followed by 28.8% between 12:00-18:00, 25.7% between 6:00-12:00, and 13.7% between 1:00-6:00. A total of 29.4% of the patients stated that they had been bitten between 18:00-24:00, 26.3% between 12:00-18:00, 25.6% between 6:00-12:00, and 18.7% of them between 1:00-6:00. Most scorpion and snake bites occurred between 12:00. and 24:00. Cat and dog bites usually occurred during daylight, while tick bites occurred throughout the day. It was also found that bee and spider bites did not occur at a certain time.

A total of 27.9% of the patients had left hand bitten, 21.1% the right hand, 10.1% the right leg and thigh, 9.8% the right arm, elbow and shoulder, 7.5% the head and face and 3.9% of the right foot and 3.5% bitten in both hands.

A total of 60.7% ($n=328$) of the patients were observed in the emergency department, 29.8% ($n=161$) of them observed in toxicology, 6.3% ($n=34$) of them observed in intensive care unit, and 3.1% ($n=17$) of them observed in other units.

An Antihistaminic-steroid-tetanus treatment was used for 59.6% of the patients, analgesic-antihistaminic-steroid for 25.0%, intravenous immunoglobulin-dressing-rabies vaccine for 10.1% and analgesic-steroid treatment for 2.2% patients.

The length of stay was (48.56 ± 26.92) h in snake bite cases, (17.01 ± 10.74) in scorpion bite cases, (8.98 ± 8.77) in bee sting cases, (7.16 ± 13.43) in tick bite cases, (6.09 ± 5.87) in spider-centipede-insect bite cases, (3.30 ± 5.49) in dog bite cases and (1.44 ± 1.55) h in cat bite cases. There was a significant difference in the length of stay among different animal species ($P < 0.001$).

Since this is a retrospective study, the blood pressure values of seven patients were not found. so, the total number was 533 for blood pressure values. Blood pressure values are shown in Table 3, and there were significant differences among different animal species ($P < 0.001$).

The laboratory values are shown on Table 4. There were significant differences in leucocyte and platelet counts among different animal species ($P=0.001$). The sub-groups that created the difference were cat-snake ($P=0.036$), tick-snake ($P < 0.001$), and scorpion-snake ($P < 0.001$) for leucocyte counts. The difference in the sub-groups of platelet count were caused by dog-snake ($P=0.005$), tick-snake ($P < 0.001$), scorpion-snake ($P < 0.001$), bee-snake ($P < 0.001$), spider-snake ($P=0.012$).

Table 1. Sociodemographic characteristics.

Variables	Number (<i>n</i>)	Percentage (%)
Gender		
Male	297	55.0
Female	243	45.0
Age (years)		
18-30	162	30.0
31-45	141	26.1
46-60	138	25.6
61-75	79	14.6
76 and over	20	3.7

Table 2. Distribution of the animal species.

Animal species	Number (n)	Percentage (%)
Scorpio	188	34.8
Tick	107	19.8
Bee	65	12.0
Spider-centipede-insect	58	10.7
Snake	57	10.6
Dog	35	6.5
Cat	25	4.6
Others	5	0.9

Table 3. Blood pressure according to the animal species [n (%)].

Animal species	Under 140/90 mmHg	Over 140/90 mmHg
Scorpio	139 (73.9)	49 (26.1)
Snake	55 (96.5)	2 (3.5)
Cat	17 (68)	8 (32)
Dog	33 (94.3)	2 (5.7)
Tick	93 (86.9)	14 (13.1)
Spider-centipede-insect	47 (82.5)	10 (17.5)
Bee	52 (81.3)	12 (18.8)

Table 4. Laboratory values.

Animal species	Leucocyte (thousands/ μ L)	Platelet (μ L)
Scorpion	8.23 \pm 2.45	256 818.18 \pm 65 294.43
Tick	7.92 \pm 1.90	239 800.00 \pm 70 346.99
Spider-centipede-insect	13.03 \pm 2.00	226 000.00 \pm 32 233.52
Bee	10.27 \pm 2.81	284 666.67 \pm 49 423.34
Cat	7.01 \pm 2.05	246 000.00 \pm 59 565.09
Dog	8.50 \pm 3.05	255 000.00 \pm 49 101.93
Snake	11.85 \pm 5.12	179 456.14 \pm 104 462.24

4. Discussion

This study investigates patients with toxic and non-poisonous insect bites and animal stings admitted to emergency department. Snake bites is the most common cause, followed by scorpion and bee sting, tick clinging, cat and dog bites. Our study was performed in Turgut Ozal Medical Center emergency department, all patients who came to the emergency department due to the scorpion sting were conscious at the time of arrival. The most common symptom due to scorpion bites was local pain and paralysis, followed by nausea, dizziness and abdominal pain. No severe cardiac and respiratory pathologies were found. Patients did not develop anaphylaxis and they were not hospitalized in intensive care unit. A prospective study of 120 patients by Al *et al.*[8] showed that the most common symptom was local pain, and patients did not develop severe systemic symptoms, which is similar to our study.

The study of Gajre and Dammas (1999) in Saudi Arabia between 1991 and 1995 reported that 208 of the 308 patients were 5-12 years[9]. Özkan *et al.*[10] evaluated 930 cases of scorpion stings in Turkey between the years 1995-2004, and found that scorpion stings are the most common between 20-29 years, which is similar to our study. Another study conducted by Osnaya-Romero *et al.* in Mexico in 1997 found that most cases were amongst 1-3 years old. The aim of this study was to determine the degree of intoxication according to the age group and it was concluded that the symptoms of the patients in the younger age group were much more

serious[11]. Tezer *et al.* evaluated patients who were 1-16 years and were admitted to the emergency department with the complaint of tick attachment in the center region of Ankara and, found that the mean age was 6.7 years[12]. Al *et al.* in a study conducted in Batman determined that the most patients were between 20-40 years (41%) followed by children under 10 years of age (28.2%) [13]. In the study by Kandi *et al.*[14], the mean age was (41.3 \pm 18.3) years. In our study, 30.0% were between 18-30 years, 26.1% between 31-45 years, 25.6% between 46-60 years, 14.6% between 61-75 years, and 3.7% were 76 years and over.

In the study conducted by Özkan and Cesaretli, 50.22% of the cases were female and 45.48% were male[10]. A total of 168 patients were included in the study of Sümer *et al.*[15] and 51.8% of these cases were male (n=87), which is similar to our study. In our study, 55% was male and 45% was female. However, addressing other insect bites may also affect the change of rate. The higher exposure of men to snake bites has been attributed to the fact that men work more actively than women in rural areas.

Scorpions are animals that usually hunt at night. In our study, it was observed that most of the scorpion and snake bites occurred between 24:00. and 12:00.

No fatal poisoning was observed in our study. This is likely due to the fact that the scorpion species in our region is not poisonous. In addition, the short duration of admission to the hospital decreases the likelihood of an allergic reaction.

When examined seasonally, it is seen that scorpion stings are more prevalent during summer months, especially in August and September, as scorpions prefer to the heat and arid regions. In our study, it was observed that the patients were attacked mostly during hot weather. Due to the fact that summer and autumn were hot in our region, incidence related to scorpion bites were higher in this period. In the study conducted by Kart *et al.*[16], it was reported that tick cases were more frequent between May and August. Similarly to studies of Arkan *et al.* and Kandis *et al.*, many other studies have reported that tick bites were more common in May and August[17]. The seasonal distribution of the patients was 16.9% in July, 16.5% in June, 16.8% in August, 13.2% in May and 9.6% in September.

Considering the difference in the vital signs during the admission to the emergency department, there was a significant difference among the animal species in terms of systolic blood pressure ($P<0.001$). .

The average length of hospital stay due to snake bites is 48 h, 17 h due to scorpion bites, 8 h due to bee stings, 7 h due to tick bites, 6 h due to spider-centipede insect bites, 3 h due to dog bites and 1 h due to cat bites. There was significant difference in the mean length of hospitalization among different animal species ($P<0.001$).

In a study conducted by Suchitra *et al.*, it was found that there was a relationship between the time of admission and the probability of complication development[18]. In our study, 29.4% of the patients were bitten between 18:00-24:00, 26.3% between 12:00-18:00, 25.6% between 6:00-12:00, and 18.7% of them between 1:00-6:00. Whereas 31.8% of the patients were admitted to the hospital between 18:00-24:00, 28.8% between 12:00-18:00, 25.7% between

6:00-12:00, and 13.7% between 1:00-6:00. There was no lethal cases because patients were admitted to the hospital shortly after the bite or sting.

Al et al.[13] studied 39 patients admitted to the emergency room and found that the most common tick stings were seen on the head, neck, legs and thighs. Taşkesen et al.[19] found that the ticks were most frequently seen on the leg (37%) and the trunk (21%). In our study, 27.9% of the patients stated that they were stung on their left hand and 21.1% on their right hand.

The study is retrospective and based on a single center, which is its limitations. In conclusion, we found out that in our region, the most common animal bites originate from scorpions; the maximum duration of hospitalization is because of snake bites; the most common complaint is pain and redness; the systolic blood pressure increase is seen most commonly due to snake bites and the most frequently bitten place was observed to be on the hands. More than half of the patients were treated with antihistaminic-steroid-tetanus. The community should be educated about the living areas of these animals, the seasons and hours in which they are active. Since individuals living and working in rural areas are at risk, more education should be given to them.

Conflict of interest statement

The authors report no conflict of interest.

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