Original Article

Eurasian Journal of Toxicology

An Analysis of Dog and Cat Bite Cases Attending a Tertiary Care Hospital, Bursa

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Abstract

Objective: The aim of this study was to investigate the epidemiology of dog and cat bite cases in Bursa, Turkey through 2018–2022.

Materials and Methods: A retrospective patient review was carried out. This study was conducted in the department of the Emergency Medicine of Yuksek Ihtisas Training and Research Hospital, Bursa, Turkey. The injury patterns and epidemiologic data of the patients were evaluated. A total of 92 animal bite cases were reviewed.

Results: This study was enrolled 49 men (53.3%) and 43 women (46.7%) with an average age of 37.09± 16.65 years. None of them died as a consequence of animal bite. The findings indicate that a significant correlation was found between the site of injury, the type of wound, antibiotic use, and the species of the biting animals [(p=0.001), (p<0.001), (p<0.001)]. Cats were found as the cause of animal bites in 58.7% of the cases. Of the studied cases, 97.8% had received rabies vaccination four times.

Conclusion: Education programs of society, vaccination of animals and limiting the number of stray dogs are crucial.

Keywords: Animal bite, cat bites, dog bites, emergency medicine, forensic medicine.

Introduction

Animal bite injury is a crucial public health problem, worldwide. Animal bites are a significant cause of morbidity and mortality due to tissue injury, secondary infections and transmission of the zoonotic diseases[1]. Every year 59.000 human rabies deaths occur all over the world[2]. Those deaths were commonly seen in Asia and Africa, exclusively children below 15 years-old[3]. Animal bite injury is also one of the essential forensic medicine topics in terms of its occurrence and consequences. The physicians of Emergency Medicine (EM) must prepare a forensic report besides serving required treatment.

Dog bite injuries were seen in the rate of 12.9 per 10.000 people of all admissions to the department of EM in the USA[4]. Cat bites are often innocent-looking injuries. Unlike dog bites, they are sharp and penetrating. Ischemia due to deep tissue injury and crushing is not seen in wounds caused by cat bite[5]. The bite force especially depends on the body weight, size and skull's morphology of the animal[6]. While the average bite force of canine teeth of a dog was reported as 926 Newton (N), that was 73.3 N for a cat[6]. The goal of the current study was to reveal the demographics and clinical characteristics of the animal bite injury cases in all age groups. It is also aimed at drawing attention to the epidemiologic data, injury patterns, symptoms, and consequences of such cases using regional data.

Materials and Methods

Our study was approved by the Ethics Committee of the Health Sciences University Bursa Yuksek Ihtisas Training and Research Hospital (No:2011-KAEK-25 2023/05-12). A review was made of the cohort of 92 patients who suffered from animal bite injuries and were presented to the department of EM of the tertiary hospital in Bursa city in Turkey, between 26 January, 2019 and 12 July, 2022. The patient information, including the medical status and epidemiological information, with regard to age, sex, type of treatment, status of vaccination, injury patterns, the species of the biting animals, type of wound, locations of the animal bites, and treatment method was obtained by reviewing the medical records of the patients. Superficial skin lesions were also documented.

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Received: 23.08.2023 • **Accepted:** 28.08.2023
Cite this article as: Kılıç S, Cander Cİ, Zeybek A, Yüksel M. An Analysis of Dog and Cat Bite Cases Attending a Tertiary Care Hospital, Bursa. Eurasian J Tox. 2023;5(2): 32-36

IBM SPSS Statistics for Windows, Version 21.0. (IBM Corp. Armonk, NY: USA. Released 2012) software package program was used for statistical analysis. As statistical analysis, in the data evaluation, for numeric variables mean and standard deviation, frequency tables and percentages, minimum and maximum values and median values were presented. Categorical variables are shown as the number of cases and (%). Kolmogorov-Smirnov test was used for the normality distribution of the data. Whether the assumption of homogeneity of variances was met was investigated with Levene's test. The significance of the difference between the groups in terms of continuous numerical variables in which parametric test statistics assumptions were met was evaluated with Student's t test, while the significance of the difference in terms of continuous numerical variables in which parametric test statistics assumptions were not met, was evaluated with Mann Whitney U test. The chi-square and Fisher's exact tests were performed while evaluating the relation among categorical variables. Results were given in the 95% confidence interval and a p-value below 0.05 was accepted as statistically significant.

Results

Ninety-two animal bite injury cases were included in our cohort. No mortality occurred. Basic demographic and injury features of the 92 patients can be found in Table 1. Males were more frequently involved (n=49, 53.3%) (Table 1). The mean age was found to be 37.09± 16.65 years. It was observed that 80 (87.0%) of the patients applied during the covid-19 lockdown. 55 (59.8%) cases were presented from the urban area of the city. Cat bite was observed in 54 of the patients (58.7%), while the most common bite location was the upper extremity (n= 69, 75.0%). While 90 (97.8%) of the patients were vaccinated against rabies, 66 (71.7%) of them were vaccinated against tetanus. None of the patients needed hospitalization. None of the patients had bone fractures, flap-style injury, or vascular injury in the skin. Other clinical demographic information of the patients was given in Table 1.

The statistical relation among the species of the biting animals and other variables were shown in Table 2. In Chi-square / Fisher's exact analysis performed to determine the relationship between patients' gender, bite period, bite location, anatomical localization of the bite, type of wound, antibiotic use, wound care, rabies and tetanus vaccine, and the species of the biting animals, anatomical localization of the bite, respectively, a significant correlation was found between the site of injury, type of wound, antibiotic use, and the species of the biting animals [(p=0.001), (p<0.001), (p<0.001)].

Cat bites were more frequently seen in the upper extremity, while dog bites were more common in the lower extremities, head, neck, face and thorax, abdomen, and back. Our results demonstrate that all lacerations were the result of dog bites and the usage of antibiotic was higher in dog bites (Table 2).

Table 1: The demographic characteristics of the patients.

Age (year) &		37,09± 16,65
Gender #	Male	49 (53.3)
	Female	43 (46,7)
Time#	During the Covid 19 Lockdown	80 (87.0)
	Other times	12 (13.0)
Place#	Urban	55 (59.8)
	Rural	37 (40.2)
The species of the biting animals#	Cat	54 (58.7)
	Dog	38 (41.3)
	Human	0
	Others	0
Region of injury#	Upper extremity	69 (75.0)
	Lower extremity	15 (16.3)
	Head/neck/face	1 (1.1)
	Chest/Abdomen/back	7 (7.6)
	Not specified	0
Type of wound#	Ecchymosis/abrasions/bruising/ break such as scratch or puncture	83 (90.2)
	Laceration	9 (9.8)
	Flap-style injury	0
	Vascular Injury	0
Antibiotics#	No	69 (75.0)
	Yes	23 (25.0)
Surgical treatment method #	Primary repair	91 (98.9)
	Wound care + debridement:	1 (1,1)
	Skin graft	0
	Vascular repair	0
Vaccinated against rabies#	No	2 (2.2)
	Yes	90 (97.8)
Vaccinated against tetanus #	No	26 (28.3)
	Yes	66 (71.7)
Type of treatment #	Outpatient/observation	92 (100)
	Inpatient	0
	Unknown	0
Number of days of hospitalization #	<7	92 (100)
	7 and higher	0
	Unknown	0
Treatment method#	Medical	92 (100)
	Surgical	0
	Unknown	0
Total#		92 (100)

Data given as & mean±standard deviation , # n (%)

Discussion

Animal bites were commonly seen in our country. In the literature, snake bites were evaluated by the researchers besides the domestic animal bite injuries[7].

Table 2: Correlations of the species of the biting animals and other variables

Variables			the species of the biting animals		Total	Chi-squared/ Fisher's exact test
			Dog	Cat		
Gender	Male	n(%)	22 (44.9)	27 (55.1)	49 (100)	p>0,05#
	Female	n(%)	16 (37.2)	27 (62.8)	43 (100)	
Time	Other times	n(%)	4 (33.3)	8 (66.7)	12 (100)	
	During the Covid 19 Lockdown	n(%)	34 (42.5)	46 (57.5)	80 (100)	p>0,05&
Place	Urban	n(%)	25 (45.5)	30 (54.5)	55 (100)	
	Rural	n(%)	13 (35.1)	24 (64.9)	37 (100)	p>0,05&
Region of injury	Upper extremity	n(%)	21 (30.4)	48 (69.6)	69 (100)	
	Lower extremity	n(%)	10 (66.7)	5 (33.3)	15 (100)	*p=0,001&*
	Head/neck/face	n(%)	1(100)	0	1 (100)	
	Chest/Abdomen/back	n(%)	6 (85.7)	1 (14.3)	7 (100)	
Type of wound	Ecchymosis/abrasions/bruising/break such as scratch or puncture	n(%)	29 (34.9)	54 (65.1)	83 (100)	
	Laceration	n(%)	9 (100)	0	9 (100)	*p<0,001&*
Antibiotics	No	n(%)	16 (23.2)	53 (76.8)	69 (100)	
	Yes	n(%)	22 (95.7)	1 (4.3)	23 (100)	*p<0,001&*
Surgical treatment method	Primary repair:	n(%)	38 (41.8)	53 (58.2)	91 (100)	
	Wound care + debridement	n(%)	0	1 (100)	1 (100)	p>0,05&
Vaccinated against rabies	No	n(%)	0	2 (100)	2 (100)	
	Yes	n(%)	38 (42.2)	52 (57.8)	90 (100)	p>0,05&
Vaccinated against tetanus	No	n(%)	7 (26.9)	19 (73.1)	26 (100)	
	Yes	n(%)	31 (47.0)	35 (53.0)	66 (100)	p>0,05&
Total		n(%)	38 (41.3)	54 (58.7)	92 (100)	

Chi-squared test &; Fisher's exact test,

Neither did any patients sustain extremity amputation nor death. A meta-analysis revealed that the number of male victims was higher (14.90 per 1000 patients) compared to female gender (4.55 per 1000 patients)[8].

Our results are in agreement with a paper from Switzerland which investigated human and animal bite injuries. It was reported that none of the patients needed hospitalization9. Another study conducted in Poland reported that, the most of the victims (79.1%) were treated in the hospital without staying a night but after the treatment they were discharged before the end of day[10].

Somewhat similar to our findings a study conducted in Bursa revealed that cat bites were more frequently seen in the upper extremity (79.77%), whereas dog bites were more common in the lower extremities (48.03%), thorax, and abdomen (4.16%)[11]. However, a study evaluating both cat and dog bite injuries in California for 15 years suggested that upper limbs were the most common injury site for both animal attacks[12].

Partly similar to our results (90.2%), a study conducted in Pakistan, indicated that most of the victims suffered from soft tissue damage (95.9%)[13].

As in our study, many researchers stated that most of the victims did not need surgical intervention (89.1%)(91.4%)(89.8%)[14,5,15].

Several authors have already reported that most of the victims (61.4%)(76%)(89.55%)(88%) were city-dwellers[10,16,17,18].

All of the cases who suffered from laceration, and needed antibiotics were the once bitten by a dog. On contrary to our results, a study was conducted in Australia, reported a significant relation between cat-related injury and increased risk of infection[19]. A possible reason for the huge difference between that study and ours was higher numbers of victims in the former study when compared with ours. The cat bites were suggested to be two times more infectious when compared to dog bites[20].

A study suggested a huge numbers of victims (97.1%) receiving a rabies vaccine when compared with our results (97.8%)[21].

Moreover, a statistically significance between lower extremity injuries and dog bite (Table-2). A study which was performed in Kenya, it was found that there was a significant relation between dog bites and head/face injuries[22].

The limitations of the present study of being conducted in a single center, and therefore, the cohort can not be representative of all cases of dog and cat bites in Bursa city. No statistical association was calculated between the period before and during the curfew of the COVID-19 lockdown period due to the low number of achieved medical records of the cases who admitted before the curfew. These are the limits of our study.

Conclusion

Our study revealed that dog bites were more dangerous compared to cat bites. It can be interpreted that the stray animals are not under enough control. We found significant differences in the two cohorts of the species of the biting animals regarding the type of wound and antibiotic use.

In light of our findings we recommend for children and old age groups to avoid close contact with big dogs and be aware of the infectious nature of cat bites. To give education to both children and their parents to have them learn how to behave to a dog or cat. Development of interventional programs, such as reducing the number of stray dogs, vaccination of animals and raising awareness of the society are vital.

Our findings have three implications. First, by means of the single centre study, injuries of dog and cat bites in the same district were compared. Second, injury patterns, social parameters, and epidemiological differences of the animal related injury cases were revealed. Third, regional data of animal bites was collected.

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