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ORIGINAL ARTICLE

Evaluation of Cases Applied to Emergency Service with Suspected Rabies Exposure in the Past Year

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Abstract

Introduction: Rabies is a zoonosis that can be transmitted by contact with an infected animal and results in death. Dog bites are the most common cause of human deaths. In this study, cases who applied to the emergency service of a training and research hospital in Istanbul due to suspected rabies exposure in the past year were examined. Our aim is to provide recommendations for reducing the need for prophylaxis after suspected exposure.

Methods: Patients who presented to the emergency department due to suspected rabies exposure between September 2017 and August 2018 were included in the study. Data were obtained by examining the emergency service files of the patients and the records kept by the hospital's rabies treatment unit. The number of cats and dogs causing suspected exposure were compared with similar studies. $p<0.01$ was accepted for statistical significance.

Results: A total of 10,974 cases applied due to suspected exposure within the time period stated above. About 50.1% (n=5493) of the cases were male and 49.9% (n=5481) were female. While the most suspected contacts were caused by cats (64.1%) and dogs (35.2%), the exposure was highest in summer and least in winter. Only rabies vaccine was administered to 87.2% of the cases admitted to the emergency service, and vaccine and immunoglobulin were administered to 9.1% of the cases. As a result of these suspected rabies exposures, no death and limb amputation were detected, while six cases had saturation.

Discussion and Conclusion: It is seen that the ratio of cats to dogs in suspected rabies exposure has increased, compared to previous years. Vaccination, sterilization, and registration of animals that can cause rabies, making appropriate markings that clearly show that the animals have been vaccinated, and raising the public awareness on this issue can reduce the need for post-exposure vaccination.

Keywords: Cat dog bite; emergency room; rabies.

Rabies is one of the oldest known diseases. With a history of 4000 years, this disease is endemic in at least 150 countries around the world. The rabies virus that causes the death of a person every 9 min is an RNA virus of the genus Lyssavirus of the Rhabdoviridae family[1]. Rabies is a zoonosis that is transmitted from domestic and wild animals to humans. It causes encephalomyelitis and is fatal[2]. The most important way of transmission of rabies is the bite

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of infected dogs. On the other hand, it can be transmitted from cats, cattle, pigs, wild animals, and other farm animals[3]. The most effective way to prevent rabies, which is a mortal and vaccine-preventable disease, is to vaccinate the animals that are likely to be infected and the risky cases that come into contact[2]. Suspected rabies exposure is most commonly caused by dogs in Turkey and around the world. Wound cleansing, rabies vaccine, and, in necessary cases, immunoglobulin (human rabies immunoglobulin [HRIG]) are administered to patients admitted to hospital after risky exposure in our country[4]. A total of 246.547 people in Turkey in 2017 admitted to hospital due to suspected rabies contact, and human rabies was seen in one case[5].

In this study, suspected rabies exposure cases who applied to the emergency service of a training and research hospital in Istanbul in the past year were examined. It is aimed to present recommendations to reduce the need for prophylaxis after rabies contact.

Materials and Methods

Patients who applied to the Emergency Medicine Clinic of Health Sciences University Haydarpaşa Numune Health Application and Research Center between September 2017 and August 2018 due to rabies risk were included in the study. An average of 20.000 patients apply to this center per year. The information of the patients was obtained from the emergency service and rabies vaccination center records.

Apart from demographic data such as gender, age, and information such as the season in which the exposure occurred, animal species, whether the animal had an owner or not in cases with cat and dog contact, the vaccination status of the animals, the status of vaccination and immunoglobulin administration of the cases, the areas of contact, were recorded. The cases were grouped according to age as between 0-9 years, 10-19 years, 20-29 years, 30-44 years, 45-64 years, and as >65 years. Two hundred and thirty-five patients were excluded from the study due to incomplete and suspicious data (cases in which immunoglobulin application is not known, animal contact is not specified, etc.). Ethics committee approval was obtained before the study.

In the study, categorical data are presented with numbers and percentages. The chi-square goodness-of-fit test was used to compare the categorical data we obtained in our study with the data specified in other studies. $P<0.01$ was accepted as statistically significant. Analyzes were performed with SPSS for Windows, version 15 (IBM Corp., United States of America, Chicago, Illinois) program.

Results

A total of 10,974 cases applied for suspected rabies contact within the specified time period. About 50.1% (n=5493) of the cases were male and 49.9% (n=5481) were female. When grouped by age; 18.1% (n=1984) cases were between 0 and 9 years, 15.6% (n=1715) cases 10 and 19 years, 24.1% (n=2644) cases 20 and 29 years, 21.0% (n=2302) cases were 30 and 44 years old, 17.3% (n=1902) cases were between the ages of 45 and 64, and 3.9% (n=427) cases were >65 years About 19.7% (n=2167) of the cases applied in the winter season, 22.9% (n=2512) in the spring season, 29.8% (n=3266) of the cases applied in the summer season, and 27.6% (n=3029) of the cases applied in the autumn season.

When examined in terms of the animal species contacted, 35.2% (n=3862) of cases were dog contact, 64.1% (n=7035) of cases were cat contact, 0.4% (n=46) wild animal (fox, wolf, jackal, etc.), and 0.3% (n=31) of the cases applied to our emergency department due to contact with other animals (horse, cattle, donkey, etc.).

Among these cases, 28.5% (n=3123) had stray dog contact, 59.8% (n=6563) stray cat contact, 3.6% (n=391) rabies vaccinated dog contact, and 1.6% (n=179) had contact with rabies vaccinated cat. In 3.7% (n=410) of the applicants, vaccination was not recommended, and in 9.0% (n=990) of the applicants, immunoglobulin (HRIG) was administered in addition to the vaccine.

Considering the distribution of the applications by district, 28.9% (n=3176) of cases were from Kadıköy, 23.7% (n=2605) from Üsküdar, 19.9% (n=2186) from Ataşehir, 7.9% (n=868) from Ümraniye, 6.7% (n=732) from Maltepe, and 12.8% (n=1407) were from other districts. While there was no death or organ amputation in any of the cases, primary incision suturing was performed in six cases.

Discussion

When the animals that cause rabies are examined, it is reported that dogs cause more than 90% of the cases worldwide. Cats, other pets, bats, and other wild animals can also cause rabies[6]. Direct contact with the saliva of the infected animal is essential for the disease to be transmitted to animals or humans. This contact is mostly by biting, scratching, and licking[7]. Washing the contact area with soap and water instantly is the most effective measure[8]. Then, appropriate immunization should be done[6]. Immunization against rabies in Turkey is based on the Rabies Field Guideline, published by the Ministry of Health[4]. The guideline covers the steps of wound care, antibiotic prophylaxis, tetanus prophylaxis, rabies vaccine administra-

tion, and immunoglobulin administration in detail, after contact with rabies.

When the cases exposed to contact are examined, it is seen that the number of school-aged children is higher in similar studies[2,7,9]. However, in our study, the high number of cases between the ages of 20-29 and 30-44 draws attention. This group, which constitutes 24% and 20%, respectively, consists of active working adults. Suspected contact and vaccination in these groups are important as they may cause loss of workforce in the working population.

In our study, the number of men and women was found to be almost equal, in cases with rabies contact. Similar studies have shown that the number of male cases is higher[7,9,10]. This difference is due to the high number of school-aged boys in areas with high number of children with exposure.

Although rabies transmission with pets is mostly controlled in the USA and some developed European countries, it is still seen in underdeveloped areas of Asia, Africa, and developing countries[8].

Data we obtained in our study in regard to cat and dog contact and data gained from other studies conducted in Turkey on the same subject at different places and times[2,8,9,11-13] are summarized in Table 1. While the cases with cat contact in our study were 64.6%, it ranged between 18.5% and 54.9% in other studies (p<0.001).

According to the World Health Organization (WHO), dogs are the most common reservoir of the virus, and more than 99% of human deaths are caused by rabies transmitted from dogs. In this context, the WHO, the World Organization for Animal Health, and the United Nations Food and Agriculture Organization held a meeting on the "Global elimination of dog-mediated human rabies: Now is the time" in Geneva, Switzerland, on December 10-11, 2015. At the conference, goals were set to end dog-related deaths by vaccinating dogs by 2030[14]. While studies were conducted on the vaccination of dogs in the transmission of rabies, it is noteworthy that the number of cats causing suspected contact in our study was significantly higher than the number of dogs (Table 1). We think that this is due to the fact that the campus where our hospital is located and the population it serves are mostly urban.

Table 1. Examination of our study and other studies with suspected rabies according to the animal species contacted

	Cat		Dog		p
	n	(%)	n	(%)	
Our study	7035	(64.6)	3862	(35.4)	<0.001
Temiz and Akkoç[13]*	142	(18.5)	626	(81.5)	<0.001
Kara and Delice[8]*	28	(25.5)	82	(74.5)	<0.001
Söğüt et al.[2]*	245	(35.0)	455	(65.0)	<0.001
Gülaçtı et al.[14]*	132	(24.3)	412	(75.7)	<0.001
Çatak et al.[15]*	179	(27.0)	485	(73.0)	<0.001
Yılmaz et al.[7]*	401	(29.5)	957	(70.5)	<0.001
Göktaş et al.[3]*	2216	(23.1)	7361	(76.9)	<0.001
Karadaş et al.[9]*	1875	(54.9)	1542	(45.1)	<0.001

Numbers marked with * are reference numbers for related studies

In the study conducted by Karadaş et al.[9] in Antalya, the higher number of cats may be an indicator of the increasing uncontrolled number of cats in metropolitan cities or the control of the number of stray dogs in recent years. The fact that the majority of the animals that cause contact are unvaccinated and without an owner may be a sign of a public health problem that will grow further in the coming years. We think that the reasons such as the lack of control of street animals, which are increasing in numbers especially in metropolitan cities, feeding the animals at home and workplaces, inadequate vaccination and sterilization, and commercial concerns of the pet shop sector, have played a role in this increase.

On the other hand, it was found that cases who came with suspected rabies exposure generally did not know the vaccine status of the animal and applied to the hospital not to take any risk. The escape of the animal that caused the contact creates anxiety in humans. Even if the animal is vaccinated, this situation is often unknown and vaccination should be performed according to rabies field guidelines. When the data obtained from the Veterinary Services Directorate of Istanbul Metropolitan Municipality were examined, rabies vaccine was given to 22.446 stray cats and dogs throughout Istanbul in 2017, and to 22.745 cats and dogs in January–November 2018, while 6274 and 5595 animals were vaccinated in 2006 and 2007, respectively[15]. The increase in the number of vaccines almost 4 times in the past 10 years indicates that the number of stray animals has increased and/or the importance given by the municipalities to vaccination has increased. However, more studies are needed regarding the adequacy of the number of vaccines. The ears of the vaccinated animals are notched or an earring is placed by the municipality employees. Pet owners are given a vaccine card. However, we think that the ear notches and earrings of the animals vaccinated by the municipalities are not noticed from afar and do not relieve people's anxiety. Likewise, there are no signs indicating that a pet was vaccinated when its owner is not next to the animal. For these reasons, we think that it would be beneficial to have more reliable markings indicating the

vaccine status of the vaccinated animals.

In our study, the fact that risky contacts were mostly in the summer season and the least number of contacts in the winter season were consistent with other similar studies[2,7,9,12]. The fact that the districts served by our hospital are on the coast, there are many stray animals on the tracks used by people for walking and sports, school-aged children are on summer vacation, frequent encounters with animals in parks and gardens in good weather make us think that contact increases in the summer season.

As a result, although the number of rabies cases is decreasing in our country, our proximity to the Middle East and Asian countries poses a great threat. Registering domestic and stray animals, vaccination and sterilization may prevent their uncontrolled reproduction. In addition, we think that the requirement of microchips for the animals with owners and the marking of vaccinated stray animals with tattoos, earrings, or paint that can be seen from a distance may be useful in relieving the concerns of citizens.

In this way, in Istanbul, where the population density and the number of working people are in the majority, the need for prophylaxis after contact can be reduced in case of suspicious contact. Workforce loss, unnecessary vaccine costs, and vaccine side effects can be avoided by reducing the need for post-exposure prophylaxis.

Ethical Committee Approval: Study was approved by the Clinical Research Ethics Committee of Haydarpasa Numune Training and Research Hospital (17/12/2018 decision number HNEAH-KAEK 2018/78).

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