Evaluation of case reports for contacts with risk of rabies-Samsun sample

Eurasian Clinical and Analytical Medicine Original Research

Evaluation of contacts with risk of rabies

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Abstract

Aim: Turkey is an endemic area for rabies infection. The number of contact cases at risk of rabies has not decreased as quickly as expected. We investigated the one-year at-risk contacts observed in Samsun between January 1 and December 31, 2014.

Methods: This is a retrospective, cross sectional study. Data were taken from at-risk contact report forms collected in public health institutions. Analyses were made on June 2015 using the SPSS 20.0 package software.

Results: We analyzed 2892 cases, of whom 69.9% were male. The difference in median age by gender (m:27, f:32) is significant (p=0.000). More patients were found in the 10-19 age group (21.1%) than in any other group. 75.5% of the animals causing an at-risk contact were dogs; however, in Atakum, injuries were caused by cats at nearly

two times the rate of other towns (p=0.000). At-risk contacts were observed most commonly in the spring (31.8%). Rate of females who take medication or have a diagnosed disease is nearly two times the rate in males (p=0.000). There was an extremity injury in 95.4% of the cases.

Conclusion: Stray dogs are a public health problem that must be addressed. Rabies infection can be prevented by vaccination and antiserum. Public health services should work in constant collaboration with other disciplines.

Keywords

rabies, at-risk contacts, Turkey, Samsun, dog

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Introduction

Rabies is a Lyssavirus virus from the rhabdoviridae family. It is mainly transmitted to humans through contact with infected animals. Most often, it causes a deadly encephalomyelitis infecting the central nervous system within 20-90 days. The microorganism is generally spread by the saliva of the biting animal inoculating in the subcutaneous or muscle tissue of a person; other contaminations are very rare.[1] Around the world, between 30,000 and 70,000 people die every year from rabies, according to World Health Organization (WHO) data.[2] Turkey is still an endemic area for rabies infection.[3] While the rabies occurrence rate in Turkey as a whole has decreased in recent years, there has been an increase in the Aegean region. Furthermore, the number of at-risk contacts has not decreased as quickly as expected. Different solutions are still applied in Istanbul's Anatolian side and inIzmir, which is a city in the Aegean region.[4,5] Domestic dogs are the main vector in the transmission of rabies among animals in developing countries (such as Turkey) and in undeveloped countries.[6] In contrast, wild animal rabies stands out in developed countries where domestic animal rabies is under control. Although it is always fatal in unvaccinated people, protection from rabies is possible in vaccinated people.[7] All contacts with risk of rabies that took place in Samsun, Turkey in 2014 were evaluated in this study. Samsun is an ideal city for this research because it is representative of Turkey as a whole regarding the population, socioeconomic level, and geography. This study is important because Turkey is the European country in which dog-caused rabies cases are the most common.[8]

Materials and Methods

This is a retrospective, cross-sectional study. All contacts with risk of rabies that took place in Samsun between January 1 and December 31, 2014 were evaluated. Data were taken from risky contact report forms collected in public health institutions. The report forms used in the various towns of Samsun are not standardized–three different forms were used. Generally, the forms recorded demographic information about the patient, climate and seasonal characteristics, the species and present condition of the animal, the type of injury, and vaccine application. Since the questions are not the same in each form, the number of data differs for some parameters. In addition, a separate retrospective file scanning study revealed some missing data. Analyses were made on June 2015. The chi-square test was applied in values countable for statistical analyses; the Fisher Exact Test was used when the expected value was higher than 20% or lower than 5% of cell groups; and the suitability of measurement values to normal distribution was examined by visual (histogram and probability graphics) and analytical methods (Kolmogorov-Smirnov). The Wilcoxon and Mann Whitney U test was applied in analyses without a normal distribution. The SPSS 20.0 package software was used in analysis. Statistical meaningfulness was accepted as $p<0.05$. All the procedures in the study were designed in accordance with the Helsinki Declaration and Good Clinical Practice guidelines and approved by the Ondokuzmayis University Institutional Ethical Committee (29.05.2015).

Results

2892 cases were analyzed in our research. Among the participants, 69.9% (n=2021) were male and 30.1% (n=871) were female. The age distribution of the cases was not homogenous. The median age was 27 for males and 32 for females, a difference that is statistically significant (p=0.000). 78.9% of contacts took place in the city and 21.1% in rural areas. Among the age groups categorized by decade, the most common group of patients was in the 10-19 age group (21.1%). With respect to animal species, there was no statistical difference by patient age. Significant results were reached when gender was considered, dog contact in all cases and cat contact in females are more common (p=0.000). 75.5% of the animals with risky contact were dogs and 23.3% were cats (Table 1). 79.3% of contacts were biting. It was learned that 6.8% of the patients had been attacked previously. 94.1% of the patients did not have rabies prophylaxis before the contact. Distribution of deficiencies in our data obtained from 2892 cases considering parameters is shown in Table 2. Contacts were observed most commonly in spring (31.8%) and most rarely in autumn (17.4%). However, it was interesting that in Havza town, autumn was the season

Table 1. Kinds of Animals with Risky Contact

Animal	Number	Percentage
Dog	2144	75,5
Cat	661	23,3
Donkey	8	0,3
Monkey	6	0,2
Horse	4	0,1
Undetermined kind	4	0,1
Mouse	2	0,07
Bat	2	0,07
Pig	2	0,07
Cow	2	0,07
Sheep	1	0,03
Squirrel	1	0,03
Hawk	1	0,03
Fox	1	0,03
Total	2839	100

Table 2. Missing Parameter Data

Form Sections	Missing Data (n)	Percentage
Age	35	1,2 %
Contact Type	90	3,1%
Kind of Animal	53	1,8%
Present Condition of Animal	39	1,3%
Previous Exposure	810	28,0%
Previous Prophylaxis	1061	36,7%
Constantly Used Medicine and Constant Disease	813	28,1%
Contact Place	2258	78,1%
Case Place	2636	91,1%

Table 3. Constantly Used Medicine or Present Disease. Case-Contact Place Comparison.

Gender	Constantly Used Medicine or Present Disease		P value
	Yes (n,%)		
Male	107 (7,4 %)		0.000 (Pearson Chi Square)
Female	84 (13,3 %)		
Total	191 (9,2 %)		
Contact Place	**Case Place**		**P value**
	City (n,%)	Rural area (n,%)	
Extremity or Body	193 (78,1%)	54 (21,9%)	0.209 (Fisher's Exact Test)
Head, neck	8 (100%)	0 (0%)	
Total	201 (78,8%)	54 (21,2%)	

in which atrisk contact was most common (38.3), while in Salipazari town it was winter (33.8%). It was determined that males were most often attacked in May and females in August (Figure 1). Most frequently, the attacks were by owned but unvaccinated animals (m= 29.3%, f= 30.4%). 6.6% of males and 7.1% of females had a previous at-risk contact. Report forms asked whether the patient had any chronic diseases; 9.2% of the patients indicated some chronic disease such as diabetes mellitus, hypertension, hypothyroid, depression, asthma, or cardiac failure. Interestingly, rate of females who take medication or have a diagnosed disease is nearly two times the rate in males; this difference is statistically significant (p=0.000). There was an extremity injury in 95.4% of all contacts (Table 3). Although all head and neck injuries took place in the city, no statistical difference was found when place of occurrence was compared. Samsun has 17 towns. In this study, at-risk contact was most frequently seen in Ilkadim (25.1% of occurrences) and secondly in Atakum (10.4%). There was no difference observed for gender distribution by town (p=0.155). When the animal species were compared among the towns, injuries caused by cats in Atakum were nearly two times the rate of other towns and this difference was statistically significant (p=0.000) (Table 4). Biting was the most common contact type for dogs (91.1%), whereas the scratching rate was higher for cats (57.1%). Overall, a significant difference was detected for animal species.

Table 4. Comparison of Animal Kinds Among Towns

		Dog	Cat	Other	Total
Other Towns	n	1977	535	28	2540
	%	77,8%	21,1%	1,1%	100,0%
Atakum	n	167	126	2	295
	%	56,6%	42,7%	0,7%	100,0%
Total	n	2144	661	30	2835
	%	75,6%	23,3%	1,1%	100,0%

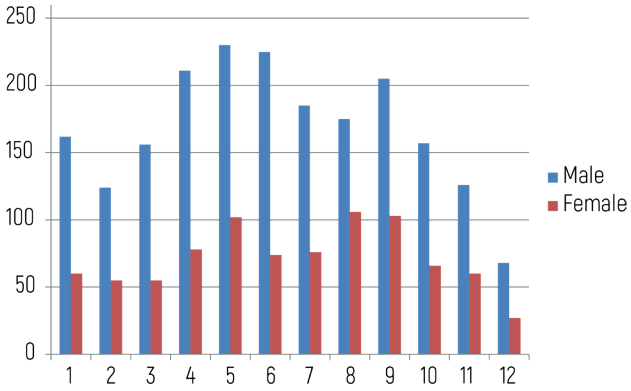

Figure 1. Number of Cases in Months

Figure 2. Samsun and its towns

Post hoc analysis determined that the group causing the difference was cats. According to this, while scratching was significantly higher in cats, biting was higher with dogs and other animals. (p=0.000). 54.9% of the animals were owned, 23.5% were stray and 21.6% were unknown because they ran away, died or were killed. 64.1% of dogs were owned; of these, 49.0% were vaccinated. Only 24.3% of cats were owned, and of these, only 21.8% were vaccinated. There was a significant difference among cats and dogs when vaccination and ownership are considered (p=0.000). Rabies antiserum was applied in 8.0% of all cases. The rate of completing 5 doses was 42.3%.

Discussion

Rabies has been observed in all regions of the world, excluding Antarctica and some island countries. It is among the most common viral causes of mortality in developing countries.[9] Although the surface area of the world doesn't change, the increase in the number of human beings and dogs increases the contact risk.[10] Dogs are still the main rabies reservoirs in many regions. Most of the people dying from rabies have a low socioeconomic status.[11] Rabies has been eradicated in England, Japan, Belgium, Finland, France, Norway, Portugal, Spain, Switzerland, and Sweden.[12] 247 rabies related deaths were reported in Turkey between 1980 and 2006.[8] According to another data set, 39 rabies cases were reported in Turkey between 1992 and 2007 (31 male, 8 female); the median age of the cases was calculated as 28.6 ± 19.3 (min. 5, max. 69). While Istanbul was the first city to track the number of at-risk contacts (11 cases), Sanliurfa (5 cases) and Izmir (4 cases) were other important cities to do so. The dog is the animal which is the most common cause of at-risk contacts (29 cases).[13] In Turkey, more than 150,000 at-risk contacts per year have been reported in recent years.[14] Yearly incidence has been reported as 0.02 cases per 100,000 in Tunisia and 0.1 cases per 100,000 in Egypt.[15] Samsun city in the northern part of Turkey has 17 towns (Figure 2). With a population of 1,269,989 people, 37% of whom live in Ilkadim and Atakum towns, the population density is 136 people per square kilometre. This is higher than the average population density in Turkey (100 people/km2).[16] We calculated the at-risk contact rate as 2.2 people per 1,000 in Samsun in 2014, compared to a rate of 2.4 per 1,000 in Turkey in 2013. Thus we can say that the at-risk contact rate in Samsun is rep resentative of Turkey in general. However, Samsun is among the cities in which the disease risk is lower due to the lower number of rabies cases in humans. Dogs are responsible for 75.5% of at-risk contacts in Samsun. Atakum is the most socioeconomically developed city in Samsun.[17] Although there is no information showing that the number of cats in this town is higher than in other towns, at-risk contacts from cats were interestingly much higher than in other towns. It may be that higher education and income level may constitute a higher rate of cat ownership. It was reported that animal rabies were very rare among dogs in Continental Europe, where red foxes constitute 50-75% of the cases .[18,19] The ratio of pet rabies to wild animal rabies is 10:1 in Turkey, 1.7:1 in Russia and 1.4:1 in Ukraine.[20] Dogs were responsible for 79% of the cases in Alaska, 59.5% in New Zealand, and 81.2% in France.[21-23] In some studies, cat and dog rates were very close.[24,25] In a study made in the United States, 67% of the cases were due to wild animals, especially racoons.[26] The most frequent cause of rabies in Baltic countries is racoons, followed by red foxes and badgers f.[27] Boys were bitten more frequently by dogs than were girls, according to Morgan's research.[28] Similarly, dog contact in males and cat contact in females were higher in our study. In a study by Gulacti et al, it was observed that at-risk contact was significantly lower in the 0-5 age group, significantly higher in the spring, and significantly higher in cities compared to rural areas. Dog contacts were more common than contacts with other animals.[29] Gunduz et al. identified

the 0-8 age group and Sogut et al. identified the 6-15 age group as the most frequently affected.[30,31] According to WHO data, 40% of contact cases with rabies risk were observed in children under the age of 15. On the other hand, there are publications showing that adult males are affected more. Our findings demonstrate that at-risk contact occurs most often between 10-19 years of age in the city in spring. Mitchell et al. determined that the areas most often affected in children were the head and neck.[32] In our study, extremities were the area most often injured. Head-neck injury risk is higher in children because they are shorter. People trying to communicate with cats and dogs using their hands and arms or trying to get them away during attack is the main factor in extremity injuries. In some studies in Turkey it was stated that nearly half or more of the animals were stray .[30,33,34] Strayed animal ratio was about 30% when animals whose owners were unidentifiable were kept apart in our study. This ratio was higher in cats.It was stated that vaccinating at least 70% of the dogs in endemic regions would knock down the disease.[35] In a study by Sengoz et al, it was determined that only 6% of the animals were vaccinated.[36] According to our findings, it was understood that 25-50% of the animals were vaccinated. Up to 5 doses of vaccine can be applied in Turkey, depending on the damage caused by the animal with rabies risk or observability of the animal. According to a study made in Diyarbakir, in 87.5% of the cases 3 doses and in 12.5% of the cases 5 doses of human diploid cell culture vaccine were applied. Overall, rabies antiserum was applied in 8.2% of all cases.[37] In a study in which Goktas et al evaluated nearly 11 thousand patients, it was observed that rabies antiserum was applied in 3.1% of the cases.[38] 5 doses of vaccine in 42.3% of the cases and rabies antiserum in 8.0% of the overall cases were applied in Samsun. In the struggle against wild dogs, the most cost-effective way is poisoning, especially in areas which are remote and hard to reach. Setting up a trap is one of the methods which can be used in order to capture in areas where poisoning is not practical, rational, or legal.[39,40] Since this research is based on retrospective evaluation, it was compiled in the light of information and findings obtained from the files. Again as the forms in different formats were evaluated together, there may be some limitations in the evaluation of the cases due to missing data. The fact that we have a sufficient amount of suspected contact cases makes the study valuable. Rabies disease is still observed in our country. In particular, dog contact is the most risky contact type determined. So stray dogs are an issue that must be addressed. Even though rabies is incurable, infection can be prevented, and vaccination and poisoning have an important role in this. Public health services, health personnel, veterinary services. and municipalities should work in constant collaboration. Education to be provided to teachers and students in schools could be effective in protecting against the disease and a tool in crisis management.

Declarations

Animal and Human Rights Statement

All procedures performed in this study were in accordance with institutional and national ethical standards and the 1964 Helsinki Declaration and its later amendments.

Informed Consent

Informed consent was waived due to the retrospective nature of the study.

Conflict of Interest

The authors declare no conflicts of interest.

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Scientific Responsibility Statement

The authors declare that they are responsible for the scientific content of the article, including study design, data collection, analysis and interpretation, manuscript preparation, and approval of the final version of the manuscript.

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References

1. Warrell MJ. Rabies. In: Cook GC, Zumla AI, eds. Manson's tropical diseases. 21st ed. Saunders; 2003:807-821.
2. Knobel DL, Cleaveland S, Coleman PG, et al. Re-evaluating the burden of rabies in Africa and Asia. Bull World Health Organ. 2005;83(5):360.
3. T.C. Resmi Gazete. Kuduz korunma ve kontrol yönergesi. Sayı: B10OTSH0110002/7755. Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü; 2001.
4. Johnson N, Black C, Smith J, Un H, McElhinney LM, Aylan O, et al. Rabies emergence among foxes in Turkey. J Wildl Dis. 2003;39:262-270. doi:10.7589/0090-3558-39.2.262
5. Johnson N, Un H, Vos A, Aylan O, Fooks AR. Wildlife rabies in western Turkey: the spread of rabies through the western provinces of Turkey. Epidemiol Infect. 2006;134(2):369-375. doi:10.1017/s0950268805005017
6. Gurcay M, Turan T, Ozkaraca M, Irehan B. Türkiye'nin doğu ve güneydoğu Anadolu bölgelerinde hayvan kuduzunun epidemiyolojisi. FÜ Sağ Bil Vet Derg. 2010;25(2):61-66.
7. Manning SE, Rupprecht CE, Fishbein D, et al. Human rabies prevention – United States, 2008: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep. 2008;57(RR-3):1-28.
8. Kuduz şüpheli ısırık görülme ve kuduz mortalite hızları, Türkiye, 1980-2006. Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü Çalışma Yıllığı; 2006.
9. Bleck TP, Rupprecht CE. Rhabdoviruses. In: Mandell GL, Bennett JE, Dolin R, eds. Principles and practice of infectious diseases. 6th ed. Churchill Livingstone; 2005:2047-2056.
10. Vos A. A descriptive and estimative study of the dog population in Istanbul, Turkey. Rabies Bull Eur. 1996;20:11-14.
11. Ghosh TK. Rabies. In: Proceedings of the IX National Conference of Pediatric Infectious Diseases; 2006; Chennai, India.
12. Lale S, Celebi HB. Kuduz. Aylık Epidemiyoloji Raporu. 2002;1(4):25.
13. Buzgan T, Irmak H, Yilmaz GR, Torunoglu MA, Safran A. Epidemiology of human rabies in Turkey: 1992-2007. Turk J Med Sci. 2009;39(4):591-597.
14. Kuduz saha rehberi. T.C. Sağlık Bakanlığı Türkiye Halk Sağlığı Kurumu; 2014.
15. Gautret P, Dumas FR, Parola P, Brouqui P, Bourhy H. Risk for rabies importation from North Africa. Emerg Infect Dis. 2011;17(12).
16. Türkiye İstatistik Kurumu. Accessed July 13, 2015. http://www.tuik.gov.tr/
17. TR83 bölgesi ilçeleri sosyo-ekonomik gelişmişlik endeksi 2014 çalışması.
18. Vitasek J. A review of rabies elimination in Europe. Vet Med-Czech. 2004;49(5):171-185. doi:10.17221/5692-vetmed
19. Chautan M, Pontier D, Artois M. Role of rabies in recent demographic changes in red fox (Vulpes vulpes) populations in Europe. Mammalia. 2000;64(4):391-410.
20. Muller TH, Kramer M. Summarizing the rabies situation in Europe 1990-2002 from the Rabies Bulletin Europe. Rabies Bull Eur. 2002;26:1-6.
21. Castrodale L. Use of rabies postexposure prophylaxis supplied by the Alaska Section of Epidemiology, Alaska, 2002-2007. Public Health Rep. 2009;124(2):262-266. doi:10.1177/003335490912400214
22. Shaw MT, Visser J, Edwards C. Rabies postexposure consultations in New Zealand from 1998 to 2012. J Travel Med. 2015;22(1):31-38. doi:10.1111/jtm.12167
23. Gautret P, Soula G, Adamou H, et al. Rabies postexposure prophylaxis, Marseille, France, 1994-2005. Emerg Infect Dis. 2008;14(9):1452-1454. doi:10.3201/eid1409.071322
24. Fabricants d'Aliments Préparés pour Chiens, Chats, Oiseaux. La population animale – enquête FACCO/TNS Sofres. FACCO Magazine. 2005;31:2-9.
25. Cesur M, Olgun N. Kuduz şüpheli hayvan saldırısı şikayetiyle hastaneye başvuran olguların kuduz hastalığı hakkındaki bilgi, tutum ve davranışları. Acibadem Univ Saglik Bilim Derg. 2014;5(2):1-12.
26. Wyatt JD, Barker WH, Bennett NM, Hanlon CA. Human rabies postexposure prophylaxis during a raccoon rabies epizootic in New York, 1993 and 1994. Emerg Infect Dis. 1999;5:415-423. doi:10.3201/eid0503.990312
27. Kauhala K, Holmala K. Contact rate and risk of rabies spread between medium-sized carnivores in southeast Finland. Ann Zool Fennici. 2006;43:348-357. doi:10.1007/bf03192650
28. Morgan M, Palmer J. Köpek ısırıkları. BMJ Türkiye. 2007;12:62-66.
29. Gulacti U, Ustun C, Gurger M, Sahan M, Satici O. Kuduz şüpheli temas vakalarının epidemiyolojisi ve kuduz profilaksisi uygulamasının değerlendirilmesi. Turkiye Klinikleri J Med Sci. 2012;32(3):759-765.
30. Gunduz T, Elcioglu O, Balci Y. An evaluation of dog and cat bites over a five-year period: a sample case from Eskisehir. Ulus Travma Acil Cerrahi Derg. 2011;17(2):133-140. doi:10.5505/tjtes.2011.86846
31. Sogut O, Sayhan MB, Gokdemir MT, Kara HP. A preventable public health challenge in southeastern Turkey: rabies risk-contact cases. JAEM. 2011:14-17. doi:10.5152/jaem.2011.004

32. Mitchell RB, Nanez G, Wagner JD, Kelly J. Dog bites of the scalp, face, and neck in children. Laryngoscope. 2003;113:492-495. doi:10.1097/00005537-200303000-00018
33. Kilic B, Unal B, Semin S, Konakci SK. An important public health problem: rabies suspected bites and post-exposure prophylaxis in a health district in Turkey. Int J Infect Dis. 2006;10:248-254. doi:10.1016/j.ijid.2005.05.010
34. Karadag M, Catak B, Basturk S, Elmas S. Assessment of rabies-risk contact notifications in Yildirim, district of Bursa. Turk J Fam Pract. 2014;18(3):45-49.
35. Report of the third meeting of the Middle East and Eastern Europe Rabies Expert Bureau. Mérieux University; 2015.
36. Sengoz G, Yasar KK, Karela SN, Yildirim F, Vardarman FT, Nazlican O. Evaluation of cases admitted to a center in Istanbul, Turkey in 2003 for rabies vaccination and three rabies cases followed up in the last 15 years. Jpn J Infect Dis. 2006;59(4):254-257. doi:10.7883/yoken.jjid.2006.254
37. Temiz H, Akkoc H. Diyarbakır Devlet Hastanesi kuduz aşı merkezine başvuran 809 olgunun değerlendirilmesi. Dicle Tıp Derg. 2008;35(3):181-184.
38. Goktas P, Ceran N, Karagul E, Cicek G, Ozyurek S. Kuduz aşı merkezine başvuran 11017 olgunun değerlendirilmesi. Klimik Derg. 2002;15(1):12-15.
39. Fleming P, Corbett L, Harden R, Thomson P. Managing the impacts of dingoes and other wild dogs. Bureau of Rural Sciences; 2001.
40. Sparkes J, Fleming PJ, Ballard G, Scott-Orr H, Durr S, Ward MP. Canine rabies in Australia: a review of preparedness and research needs. Zoonoses Public Health. 2014:1-17.