MCBU SBED
MANİSA CELAL BAYAR ÜNİVERSİTESİ SAĞLIK BİLİMLERİ ENSTİTÜSÜ DERGİSİ
MANISA CELAL BAYAR UNIVERSITY JOURNAL OF INSTITUTE OF HEALTH SCIENCE
ISSN: 2147-9607

ARAŞTIRMA MAKALESİ
RESEARCH ARTICLE
CBU-SBED, 2023, 10 (3): 198-203

What Is The Role Of Contact With Animals In Covid 19 Pneumonia?

Covid 19 Pnömonisinde Evcil Hayvanlarla Temasın Rolü Nedir?

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Gönderim Tarihi / Received:14.12.2023
Kabul Tarihi / Accepted: 25.08.2023
DOI: 10.34087/cbusbed.1214511

Öz

Giriş: Yeni korona virüsünün (COVID-19) insandan insana yayıldığı kabul edilmektedir. Hayvanların COVID-19'un yayılmasında rol oynadığına dair net bir kanıt yoktur.
Amaç: Bu çalışmanın konusu evcil hayvan teması ile COVID-19 pnömonisi arasındaki ilişki olup olmadığını ortaya koymaktır.
Yöntem: Evcil hayvanlarla temas ortamları olarak; kapalı alan, bahçe, sokak ve işyeri temas kategorileri oluşturularak anket şeklinde katılımcılara soruldu.
Bulgular: Akciğer tutulumu ve PCR pozitifliği açısından, sokakta bir evcil hayvanla temas eden gruplar arasında istatistiksel olarak önemli farklılıklar vardı (P-değeri 0,010, 0,011). Ayrıca sokakta kedi ile temasın varlığı açısından da diğer evecil hayvanlara göre anlamlı farklılıklar vardı (sırasıyla P-değeri 0,030 -0,016). Diğer temas koşulları açısından gruplar arasında istatistiksel olarak anlamlı bir farklılık yoktu.
Sonuç: Bu bulgular, sokaktaki evcil hayvanlarla, özellikle kedilerle temasın COVID-19 pnömonisinin bulaşmasında rol oynayabileceğini düşündürmektedir. Evcilhayvanlar, fomitler yoluyla COVID-19'un yayılmasında dolaylı rol oynayabilir ve insanlar için alınan önlemler evcil hayvanlar için de alınmalıdır. COVID-19 ile enfekte olduğundan şüphelenilen veya doğrulanan kişiler, evcil hayvanlarla doğrudan teması en aza indirmeli ve evcil hayvanlar izole alanlarda tutulması önerilmektedir

Anahtar Kelimeler: covid 19, covid 19 pnömonisi, evcil hayvanlar, bilgisayarlı tomografi, COVID-19, Pulmonary computed tomography, Pet, COVID-19 pneumonia

Abstract

Introduction: The novel coronavirus (COVID-19) is considered to spread from person to person. There is no clear evidence that animals play a role in the spread of COVID-19.
Objectives: The subject of this study was the relationship between pet contact and COVID-19 pneumonia.
Patients and Methods: The participants were questioned by creating contact categories of home, garden, street and workplace as environments in contact with pets.

Results: In terms of lung involvement and PCR positivity, there were a statistically significant differences between the groups in terms of contact with a pet on the street (p-value: 0,010, 0.011) and the presence of contact with a cat on the street compared to other pets (p-value: 0.030 -0.016, respectively). There was no statistically significant difference between the groups in terms of other contact conditions.
Conclusion: These findings suggest that contact with pets on the street, particularly cats, may play a role in the transmission of COVID-19 pneumonia. Pets can play a role in the transmission of COVID-19 through fomites, and also for pets taken for humans. Persons suspected or confirmed to be related to COVID-19 should minimize direct contact with pets and isolate pets.

Keywords: COVID-19, pets, COVID-19 pneumonia, lung involvement

1. Objective

2019 coronavirus (CoV) infection occurs by being spread from people infected with SARS-CoV-2 to other people[1,2]. The World Health Organization (WHO) later named this disease as **Coronavirus Disease** 2019 (COVID-19). Immediately afterwards, on March 11, 2020, WHO declared COVID-19 as a pandemic [3]. SARS-CoV-2 is mainly spread from person to person through coughing, sneezing and speaking (droplet).

CoVs naturally cause respiratory diseases in mammals, birds, cows, pigs and chickens. In addition, they can cause potentially fatal respiratory tract infections in humans [1,2]. Some coronaviruses that infect animals can also occasionally spread among humans and cause serious infections [4]. There are seven types of CoV that are considered to infect humans [5]. Among them, only Middle East respiratory syndrome coronavirus and severe acute respiratory syndrome coronavirus cause serious human diseases. The rest are associated with mild respiratory ailments such as the common cold [6]. In light of current information, there is no clear evidence that animals play a role in the spread of the virus that causes COVID-19 [1].

Real-time reverse transcriptase-polymerase chain reaction (RT-PCR) and computed tomography (CT) are used in the diagnosis of COVID-19 [7]. Although RT-PCR is accepted as the first tool for final diagnosis of COVID-19 disease, CT is considered more effective in determining the diagnosis and treatment process due to its high false negative rate and low sensitivity (60-71%) compared to CT [7].

This study was on the relationship between pets and Covid-19 pneumonia and Lung Involvement.

2. Patients And Methods

The population of this study consisted of patients who applied to the Manisa City Hospital and Bursa Yüksek İhtisas Training and Research Hospital Emergency Covid-19 polyclinic between January 15, 2021 and March 15, 2021 and showed symptoms such as fever, sore throat, shortness of breath, diarrhea. The study included 1065 patients. Among these patients, those who did not undergo pulmonary imaging (n = 149), had pulmonary edema (n = 10) and severe lung parenchymal injury (n = 7), were excluded from the study. The data of the remaining 899 patients were included in the study. The places that come into contact with pets are categorized as home, garden, street and workplace.

PCR examinations and chest CT results of the patients were followed up for six months from the medical records, and it was recorded whether there was a PCR positivity or typical Covid-19 finding in the chest CT at any time. Those with typical covid findings according to radiology reports were accepted as COVID-19 pneumonia. Permission was obtained from the Medipol University Scientific Studies Ethics Committee for our research. Date of permit : 01/06/2021 E-10840098-772.02-2484.

2.1. Statistical analyses

Statistical analyses were conducted using Statistical Package for Social Sciences (software version 26.0, SPSS Chicago, USA). The Pearson chi-square test and Fisher's Exact test were used to analyze the association between categorical variables. The Mann-Whitney U test was used to compare the non-parametric continuous variables between two groups.

3. Results

A total of 899 people, 55.1% male and 44.9% female, participated in the study. When the distribution of PCR positivity, gender, age, smoking, and discharge status of the cases was analyzed according to lung involvement, a statistically significant difference was found between the groups in terms of PCR positivity, age, and discharge status (p-value <0.001 for each). There was no statistically significant difference between the groups in terms of gender and smoking status (p-values 0.891, 0.161, respectively) (Table 1).

When the distribution of contact places with pets is examined according to lung involvement; there was a statistically significant difference between the groups in terms of contact with a pet on the street and the presence of contact with a cat on the street compared to other pets (p-value: 0,010 and 0.030, respectively). There was no statistically significant difference between the groups in terms of other contact cases (Table.2).

Table 1: Comparison of PCR positivity, gender, age, smoking and discharge status according to lung involvement

		With no lung involvement		With lung involvement		P value
		n	%	n	%	
PCR	Negative	674	75	37	32,5	***<0.001***
	Positive	225	25	77	67,5	
Gender	Male	495	55,1	62	54,4	0,891
	Female	404	44,9	52	45,6	
Age	18-29 year	332	36,9	8	7	***<0.001***
	30-39 year	219	24,4	12	10,5	
	40-49 year	154	17,1	27	23,7	
	50-59 year	94	10,5	14	12,3	
	60-69 year	59	6,6	30	26,3	
	70-79 year	41	4,6	23	20,2	
	Mean±SD (Median (Min.-Max.))	38,08±15,04 (34 (17-89))		54,85±16,31 (57 (20-96))		***<0.001***
Smoker	Not smoke	579	64,4	81	71,1	0,161
	Smoke	320	35,6	33	28,9	
Discharge status	Discharge	892	99,2	59	51,8	***<0.001***
	Hospitalization	7	0,8	52	45,6	
	Intensive care	0	0	3	2,6	

Table 2: Distribution of contact places with pets according to lung involvement

	With no lung involvement		With lung involvement		P value
	n	%	n	%	
Contact at home	193	21,5	24	21,1	0,919
Cat	83	9,2	10	8,8	0,873
Dog	38	4,2	6	5,3	0,623
Bird	67	7,5	7	6,1	0,612
Cat & Dog	4	0,4	0	0,0	1,000
Cat & Dog & Bird	1	0,1	1	0,9	0,213
Contact at garden	14	1,6	1	0,9	1,000
Cat	5	0,6	1	0,9	0,512
Dog	5	0,6	0	0,0	1,000
Cat & Dog	1	0,1	0	0,0	1,000
Goat	1	0,1	0	0,0	1,000
Cat & Dog & chicken	2	0,2	0	0,0	1,000
Contact on street	48	5,3	13	11,4	***0,010***
Cat	29	3,2	9	7,9	***0,030***
Dog	16	1,8	4	3,5	0,269
Cat & Dog	3	0,3	0	0,0	1,000
Contact at workplace	18	2	4	3,5	0,299
Cat	2	0,2	0	0,0	1,000
Dog	16	1,8	4	3,5	0,269

When the distribution of contact places with pets is examined according to PCR positive cases; there was a statistically significant difference between the groups in terms of contact with a pet on the street and the presence of contact with a cat on the street compared to other pets (p-values: 0.011 and 0.016, respectively). There was no statistically significant difference between the groups in terms of other contact conditions (Table.3).

Table 3: Comparison of contact places of the cases with pets according to PCR positivity

	PCR negative		PCR positive		P value
	n	%	n	%	
Contact at home	147	20,7	70	23,2	0,374
Cat	60	8,4	33	10,9	0,210
Dog	32	4,5	12	4	0,707
Kuş	50	7	24	7,9	0,609
Cat & Dog	4	0,6	0	0	0,324
Cat & Dog & Bird	1	0,1	1	0,3	0,508
Contact at garden	7	1	8	2,6	0,082
Cat	3	0,4	3	1	0,371
Dog	2	0,3	3	1	0,160
Cat-Dog	1	0,1	0	0	1,000
Goat	1	0,1	0	0	1,000
Cat & Dog & Chicken	0	0	2	0,7	0,089
Contact on street	34	4,8	27	8,9	***0,011***
Cat	20	2,8	18	6	***0,016***
Dog	13	1,8	7	2,3	0,608
Cat-Dog	1	0,1	2	0,7	0,213
Contact at workplace	14	2	8	2,6	0,497
Cat	1	0,1	1	0,3	0,508
Dog	13	1,8	7	2,3	0,608

4. **Discussion**

The article analyzed the role of contact with pets in COVID-19 pneumonia, specifically examining the distribution of contact places with pets in cases with lung involvement. In addition, the effects of factors such as age and smoking were investigated.

It seems that in a meta-analysis investigating the relationship between smoking and COVID-19 [8] the authors reported a significant increase in the severity of COVID-19 and an increased risk of death among those with a smoking history. However, in your study, no significant difference was found between COVID-19 lung involvements in cigarette users.

This discrepancy in findings may be due to several factors, including differences in study design, sample size, and population characteristics. Additionally, other factors such as age, comorbidities, and healthcare access may have influenced the relationship between smoking and COVID-19 severity.

It is important to note that while your study did not find a significant difference in lung involvement among cigarette users with COVID-19, smoking is still a known risk factor for many respiratory illnesses and is generally considered detrimental to overall health. Therefore, smoking cessation is strongly recommended to reduce the risk of various health problems, including COVID-19.

Infection of animals with SARS-CoV-2 has implications for animal and human health, animal welfare, wildlife conservation and biomedical research, but it is unlikely that infected pets will play an active role in the spreading of SARS-CoV-2 to humans. None the less, animal-to-human spread has been observed in special cases such as high animal population densities encountered in infected mink farms [9]. Some experimental studies have shown that cats, dogs, ferrets, bats, hamsters and mice can be infected with this virus. Cats, ferrets, fruit bats and hamsters can also spread the infection to other animals of the same species in the laboratory environment[10].As can be seen in our study, while no significant relationship was found in indoor contact among those who came into contact with pets, significant results were observed in street contact (Table 2). In a report published in Hong Kong, it was stated that two out of fifteen dogs were infected in homes with human cases of COVID-19. The genetic sequences of the viruses taken from the two dogs were found to be the same as that of the virus detected in the related human cases [11]. Although PCR test was not positive in any animal, measurable SARS-CoV-2 neutralizing antibody titers were found in 3.4% of dogs and 3.9% of cats. Dogs in homes with a COVID-19 case were significantly more likely to be COVID-19 positive than in homes without a COVID-19 case [12]. Although the probability of spread to humans from cats and dogs is low, SARS-CoV-2 can be spread to cats and dogs[12]. Cats vaccinated with SARS-CoV-2 can spread the virus to other cats. Although none of the cats showed symptoms, the spread of the virus continued for 4 to 5 days and an increase in antibody titers was detected until the 24th day [13]. Liège et al. reported human-to-cat transmission of SARS-CoV-2. A house cat was infected with the SARS-CoV-2 virus transmitted by its owner, and the infection caused a severe but non-fatal disease[14]. It appears that in your study, no significant difference was found in terms of lung involvement and PCR positivity among individuals who had home, garden, or workplace contact. However, a significant difference was observed in individuals who had contact with pets and cats on the street, as reported in Table 2.3. This may be explained by the higher density of cats in outdoor environments, leading to an increased likelihood of transmission. Outdoor environments may increase the risk of COVID-19 transmission due to several factors, such as overcrowding, poor ventilation, and difficulty

maintaining physical distancing. Contact with pets and cats on the street may also increase the risk of transmission, as these animals may come into contact with other infected individuals or surfaces.

SARS-CoV-2 is transmitted by particles in the form of aerosols and droplets. Recently, aerosol fomites have been mentioned as another mode of transmission[15]. Virus particles can be transmitted to new hosts by air on materials such as tissue paper and the bodies of live animals, and these particles can remain alive for a long time through dust particles [16]**.** SARS is usually transmitted through direct or indirect contact of mucous membranes (eyes, nose or mouth) with infectious respiratory droplets or fomites[16]. The lower rates of lung involvement among pet species regarding indoor contact suggest that formites may also play a role in pet-related contact positivity.. As closeness and duration of contact with contacted/infected persons increase, the risk of transmission also increases [17]. Meat and poultry processing facilities are the hotspots of SARS-CoV-2. One study reported 16.233 cases of COVID-19 and 86 COVID-19-related deaths among workers at 239 facilities [19]. The percentage of workers with COVID-19 in this study ranged from 3.1% to 24.5% per facility [19]. In another study, 25.6% (929) of employees and 8.7% (210) of their contacts were diagnosed with COVID-19.[20]

5. Conclusion

Pets are also affected by the Covid-19 disease, just like humans, and therefore they can play an indirect role in the spread of the disease, which is more likely to happen through formides. Pets should be considered as members of the household and the simple precautions taken for humans in the spread of the virus should be taken for pets in the same way. In farms, zoos and animal shelters, which are areas where people come into intense contact with animal groups, hygiene measures must be taken into account. Persons suspected or confirmed to be infected with the COVID-19 virus should minimize direct contact with pets, and these animals should be kept in isolated areas. Pets should be maintained under hygienic conditions and, if possible, zookeepers should wear a face mask. Care should be taken to wash hands before and after being near food or supplies of the animals in question, and being kissed, licked by animals, or sharing food with animals should be avoided. More research is needed to understand the ways viruses are transmitted with pets. Infection with a new animal species may increase the severity of the pandemic. Animals in close contact with humans should be followed up.

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