



Original article

Unknown biological materials brought to the emergency department

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Abstract

Objective: This study is unique as it examines biological materials brought to the emergency department. The purpose of this study was to investigate the reasons behind the presence of nonhuman biological material in the emergency department.

Methods: The materials brought were photographed and a pre-prepared survey form was filled in following examination.

Results: A total of 46 biological materials were brought to the emergency department within a 12-month period. Ticks were the most frequently brought material, and the most common reason for bringing them was *to get the creature removed from the body*. Situations in which the physician did not have knowledge about the material were more frequent among those that were neutral about being satisfied with *the attitude of the physician towards the material brought*, and satisfaction was higher in cases when the physician was knowledgeable, although this was not statistically significant.

Conclusion: Physicians should not condemn biological materials brought into the department after exposure. If possible, they should try to gain more knowledge about them. If the material is not to be stored, once it is made sure that it is not dangerous, it should be disposed of in a medical waste bin. Physicians should be knowledgeable toward the frequency and the types of such agents in their region.

Key words: emergency department, biological materials, tick

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Introduction

We live with constant positive and negative interactions with the creatures we share the world with. Although negative interactions are decreasing with increasing urbanization, the harm done to humans by other creatures is still a serious social and medical problem¹. Vertebrates such as

dogs, cats, snakes and mice, along arthropods including scorpions, ticks, bees, spiders and lice, and plants or herbal products are often responsible for medical problems^{2–4}. Conversely, there are examples of interactions between humans and other creatures that are medically positive. For example, in studies conducted in hospitals and emergency departments with the help of dogs, positive contributions to the physiological and psychological conditions of patients are reported^{5, 6}. As a result of negative interactions with creatures, individuals sometimes visit the emergency department due to toxicological exposure, infestation, and trauma (e.g. scratches, bites, blunt or penetrating trauma).

Studies examining injuries in patients that visit the emergency department after negative interactions with other creatures are common in the literature. Unlike these studies in the literature, our study is unique as it examined non-human creatures brought to the emergency department. The

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purpose of this study was to investigate the reasons behind bringing biological material to the emergency department.

Methods

Ethical board approval for this study was obtained from the Hasan Kalyoncu University (Date 06/11/18, Number: 2018-08). Authors declare that human rights were respected according to the Declaration of Helsinki. The biological materials brought to the emergency department in one of the hospitals in Gaziantep between December 2018 and October 2019, and the individuals (patients and patient's relatives) who brought the material are included in the study. Consent was obtained after informing individuals about the study. Materials brought into the emergency department were photographed and a pre-prepared survey form was filled in after examinations. The participants' age, gender, educational level, the characteristics of the material, and reasons for bringing the material are addressed in the survey form. For reasons behind bringing the material options included: *having the creature analyzed*, *having it treated*, *removing it from the body*, *being curious about what it is*, *contributing to the treatment plan* and *other* (i.e., a reason not included in the options). Finally, participants answered whether they were satisfied with the physician's attitude toward the biological material that they brought. They answered this question using the following options: *definitely yes*, *yes*, *neutral*, *no*, and *definitely not*. Following these questions, physicians recorded "whether they were knowledgeable about the biological material brought" on the survey form, followed by informing the participants about the subject.

Statistical method

The relationships between two independent variables at the categorical measurement level were tested with the Exact Chi-square test. Numbers and percentage values were given for categorical variables as descriptive statistics. The SPSS Windows version 24.0 package program was used for the statistical analysis and a P value of <0.05 was considered statistically significant.

Results

Forty-six biological materials were brought to the emergency department within a 12-month period. One of these (a plant seed) was excluded from the study, because its photograph is lost. Therefore, a total of 45 biological materials are included in the study. Participant's average age was 40.04 (17–70); 60.0% ($n=27$). Most participants had a low educational level (primary school and below), and 51.1% ($n=23$) were female. Ticks were the most frequently brought material due to tick bites. The most common reason for bringing them in was to *get the creature removed from the body*. Phy-

sicians were knowledgeable about 71.1% ($n=32$) of the materials brought, and 82.2% ($n=37$) of the participants reported satisfaction with the physician's attitude toward them. Generally, we found that materials were brought in after a toxic or traumatic exposure, but some unusual demands were also made. These include a horse with an injured hoof, a cat with four extremities amputated, a pigeon that could not fly, and a sparrow with an injured leg (Table 1 and Figure 1).

A high proportion of males (36.4%) brought material to *have the creature analyzed*, while a high rate of females (47.8%) came to *have the creature removed from the body*, although no statistically significant relationships were observed between gender and reasons for bringing the material.

A high rate (36.0%) of individuals with low educational backgrounds came to *have the creature removed from the body*; participants with moderate educational levels reported coming to *have the creature analyzed* and to *have the creature removed from the body* (30.0%). Additionally, participants with high educational levels came to *have the creature removed from the body* and reported curiosity about what it was (37.5%). According to analyses, no statistically significant differences between educational levels and why the material was brought were identified.

When evaluating physician attitudes towards the materials brought, those who presented to remove the creature from the body stated *definitely yes* (57.1%) and *yes* (34.8%). This evaluation was higher than that of the other options in different categories. While those who selected *neutral* had brought the material to *have the creature analyzed*, to *have it treated* and to *contribute to the treatment plan*, all individuals who were unsatisfied reported bringing the material to *have the creature treated* (Table 2).

Situations in which the physician had no knowledge about the material were more frequent among those reporting neutral satisfaction with *the attitude of the physician towards the material brought* and satisfaction was higher in cases where the physician was knowledgeable (*yes* 78.3% and *definitely yes* 78.6%); however, this was not statistically significant (Table 3).

Discussion

Emergency department visits because of negative interactions with creatures is a health problem frequently encountered in developed countries^{7, 8}. Annually, more than 1 million emergency department visits are due to bites and stings (by animals other than dogs), and 300,000–350,000 dog bites have been reported⁹. Medical publications contain possible effects of negative interactions with creatures and their treatment measures. In relevant publications, images of the affected patient, parts of the body involved, and treatment delivery are often included. While the characteristics

Table 1 Descriptive statistics

Age [mean (min-max)]		40.04 (17–70)	
		n	%
Educational level	Low (Primary school and below)	27	60.0
	Moderate (High school)	10	22.2
	High (University and higher)	8	17.8
Gender	Male	22	48.9
	Female	23	51.1
Material brought	Scorpion	6	13.3
	Bee	2	4.4
	Plant parts (seed, leaf, fruit)	5	11.1
	Tick (stuck to the body)	15	33.4
	Tick (removed from the body)	4	8.9
	Spider	3	6.7
	Horse (Alive)	1	2.2
	Centipede	1	2.2
	Rat	1	2.2
	Moth	1	2.2
	Cat (Alive)	1	2.2
	Pigeon (Alive)	1	2.2
	Sparrow (Alive)	1	2.2
	Chicken meat	1	2.2
	Body lice	1	2.2
Carabidae	1	2.2	
Why it was brought	To have the creature analyzed	11	24.4
	To have the creature treated	4	8.9
	To have the creature removed from the body	16	35.6
	Being curious about what it is	5	11.1
	Contributing to the treatment plan	9	20.0
The physician's knowledge	Yes	32	71.1
	No	13	28.9
Satisfaction from the physician's attitude	Definitely not	1	2.2
	Neutral	7	15.6
	Yes	23	51.1
	Definitely yes	14	31.1

of the inflicting species are also included, their photographs rarely are. Although there are no problems defining injuries caused by mammals, it can be said that there is a serious identification problem in injuries caused by arthropods⁹. Well, as emergency department physicians, are we required to see the inflicting creature in such injuries, or is it correct to bring the creature to the emergency department? Alternatively, should we be knowledgeable of every creature brought to the emergency department?

In this study, we saw that 35.6% of the creatures brought to the emergency department had been brought for removal from the body (87% of them were ticks). Tick bites cause many serious diseases including allergic reactions, Lyme disease, and Crimean-Congo hemorrhagic fever^{10, 11}. Therefore, requests to remove creatures stuck to any part of the

body are natural. This group reports the most satisfaction with the physician's attitude towards bringing the material. However, 44.4% of the creatures were brought to the emergency department *to have it analyzed* and *to contribute to the treatment plan*. In such cases, participants were unsatisfied with the attitude of the physician towards the material they may have brought to make the physician's job easier. In our study, physicians were knowledgeable in about 71.1% of the materials brought, no relationships between the physician's knowledge and satisfaction levels were reported. In light of this information, we think that the dissatisfaction in 44.4% of the aforementioned participants could be due to the physician not showing the attitude they expected. A good treatment response and doctor-patient communication are critical for patient satisfaction^{12–14}. We think that satis-



Figure 1 Photos of some of the biological materials.

faction was absent due to communication failures between the doctors and patients. The distinctive characteristics of these creatures have been explained in many medical publications and books. The purpose of this is to help physician recognize the agent, plan treatment, and foresee possible risks. Therefore, we believe that bringing these biological materials to emergency departments should not be condemned.

So, what should physicians do in such situations? How many emergency departments has this situation been defined in and where algorithms have been created? Well, can these biological materials lead to medico-legal problems re-

lated to treatment in the future? Should we store these materials? What kind of waste should they be considered to be, if we do not store them? Medical wastes by these materials may cause infectious pathogen spread and threaten community and environmental health¹⁵. Health care providers are required to know medical waste management protocols to protect their health, and environmental health¹⁶. Mostly, in such cases, physicians do not know what to do and no algorithms for emergency departments concerning these situations have been identified. On the other hand, despite biological materials potentially causing medico-legal problems relating to treatment, whether or not these materials

Table 2 Examination of the relationship between why it was brought and the variables

	Why it was brought										<i>P</i>
	To have the creature analyzed		To have the creature treated		To have the creature removed from the body		Being curious about what it is		Contributing to the treatment plan		
	n	%	n	%	n	%	n	%	n	%	
Gender											
Male	8	36.4	3	13.6	5	22.7	2	9.1	4	18.2	0.229
Female	3	13.0	1	4.3	11	47.8	3	13.0	5	21.7	
Education level											
Low (Primary school and below)	7	28.0	1	4.0	9	36.0	1	4.0	7	28.0	0.152
Moderate (High school)	3	30.0	1	10.0	3	30.0	1	10.0	2	20.0	
High (University and higher)	0	0.0	2	25.0	3	37.5	3	37.5	0	0.0	
Was the person who brought it satisfied with the physician's attitude											
Definitely not	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	0.027
Neutral	2	28.6	2	28.6	0	0.0	1	14.3	2	28.6	
Yes	7	30.4	0	0.0	8	34.8	2	8.7	6	26.1	
Definitely yes	2	14.3	1	7.1	8	57.1	2	14.3	1	7.1	

The *P* value was obtained from the Exact χ^2 test.

Table 3 The relationship between the physician's knowledge about the material and satisfaction

	The physician's knowledge				<i>P</i>
	Yes		No		
	n	%	n	%	
Was the person who brought it satisfied with the physician's attitude					
Definitely not	0	0.0	1	100.0	0.104
Neutral	3	42.9	4	57.1	
Yes	18	78.3	5	21.7	
Definitely yes	11	78.6	3	21.4	

The *P* value was obtained from the Exact χ^2 test.

should be stored, and in which conditions they should be stored under, is largely unknown for emergency department providers. When these biological materials are brought to the emergency department after an interaction, the emergency department physician should first check whether it poses a threat. If it is to be stored, it can be stored in alcohol within a sealable container suitable for the size of the material. Following this, it can be sent to the local health ministry laboratory. If it is not stored, it should be disposed of in a medical waste bin.

Extraordinarily, four creatures had been brought to the emergency department for treatment. In terms of their design and employee training, emergency departments aim to provide services to human beings. Hence, is there a legal barrier for treating animals? Does a physician have the right to deny medical assistance to a creature in need? Although legislations vary from country to country, in our country, only veterinarians can perform medical and surgical inter-

ventions on animals in accordance with the "Animal Protection Law" (number 5199)¹⁷⁾. The individuals who had brought the four living animals for treatment provided the study with the necessary information were referred to centers where they could be treated.

Conclusion

Bringing biological materials to the emergency department after exposure should not be condemned by physicians. If possible, they should try to be more knowledgeable about them. If the material is not to be stored, after making sure it is not dangerous, it should be disposed of in a medical waste bin. Physicians should be knowledgeable about the frequency and type of such agents within their region.

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