

Retrospective Analysis of Chief Complaints and Causes of Dogs and Cats during Emergency Visits: 3,180 Cases

Hyekyung Lee^{***}, Won-gyun Son^{**}, Jimin Seo^{*}, Hyunwook Kim^{*} and Inhyung Lee^{**1}

^{*}Department of Emergency and Critical Care Medicine, Haemaru Referral Animal Hospital, Seongnam 463-824, Korea

^{**}Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Seoul National University, Seoul 151-742, Korea

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Abstract : This study was performed to investigate on the frequent chief complaints and the causes of dogs and cats visiting to an emergency department, and to suggest the minimum requirements for veterinary emergency clinics in South Korea. The medical records were reviewed for 2,368 dogs and 347 cats visiting the emergency department of Haemaru Referral Animal Hospital from March 2012 to August 2013. Among them, 255 dogs and 35 cats visited more than one time and each visit was considered as an individual case. Therefore, 2,784 cases of dogs and 396 cases of cats were reviewed. The medical records were analyzed according to the criteria such as signalment, chief complaints, diagnoses, hospital admission, and outcome. In dogs, vomiting, diarrhea, or both were the most common chief complaints, followed by dyspnea, trauma, seizure, and lethargy. The most common causes of emergency visits were gastrointestinal disorders, followed by neurologic, cardiovascular, respiratory, urologic, and hematologic disorders. In cats, dyspnea was the most common chief complaint, followed by vomiting, diarrhea, or both, trauma, dysuria, and lethargy. The most common causes of emergency visits were urologic disorders followed by gastrointestinal, respiratory, infectious, and cardiovascular disorders. According to the results, vomiting, diarrhea, dyspnea, and trauma were the most frequently encountered chief complaints, which accounted for approximately 48.6% of all cases in both dogs and cats. However common causes were differed between the dogs and the cats. In order to provide proper emergency service, it is required to prepare the clinicians and facilities to diagnose and stabilize these emergency patients.

Key words : emergency, chief complaint, retrospective, dog, cat.

Introduction

In small animal veterinary emergency clinics, the readiness to stabilize the patients with various symptoms and diseases is very important. To be prepared to save as many patients as possible, veterinary facilities that provide emergency and critical patient care need to meet or exceed the minimum requirements. Although there are guidelines of minimum requirements for veterinary emergency and critical care facilities, which is provided by Veterinary Emergency and Critical Care Society (1), it is not easy for most of the general veterinary practitioners in South Korea to meet the guidelines because of the different clinical environment. In order to propose the proper minimum requirements for veterinary emergency and critical facilities, it is essential to know what are the frequent chief complaints and the causes for the dogs and the cats to visit the emergency clinic. In human medicine, there are annual reports with statistics on the visits to hospital emergency departments (10,11). However, there are no available reports that show the characteristics of emergency visits

in veterinary medicine.

Therefore, the purpose of this retrospective study is to identify the frequent chief complaints and the causes for the dogs and the cats visiting an emergency clinic, which can be provided as a reference to suggest minimum requirements of the emergency clinics in South Korea.

Materials and Methods

Animals

The dogs and the cats that visited to the emergency department of Haemaru Referral Animal Hospital from March 2012 to August 2013 were selected through a search of electronic medical records. A total of 2,368 dogs and 347 cats visited the emergency department during that period. Among them, 255 dogs and 35 cats visited more than once and each visit was considered as an individual case. Therefore, a total of 2,784 canine cases and 396 feline cases were included.

Data analysis process

The medical record of each case was reviewed retrospectively. The data included signalments, chief complaints, diagnoses, hospital admissions, and outcomes.

¹Corresponding author.
E-mail : inhyunglee@snu.ac.kr

The age groups of the patients were categorized as pediatric, adult, and geriatric. The animals from birth to 6 months of age were categorized as pediatric both in dogs and cats (8). The dogs between 7 months to 7 years of age, and the cats between 7 months to 11 years of age were categorized as adults. The dogs aged over 8 years of age and the cats aged over 12 years of age were categorized as geriatric (5). The sex was divided into four groups: intact female, spayed female, intact male, and castrated males.

For chief complaints, vomiting, diarrhea, or both were considered as one symptom. The traumas with various symptoms were recorded as trauma and lethargy with no other symptoms were regarded as lethargy. The dyspneic patients with other obvious chief complaints such as trauma, seizure, major gastrointestinal sign, foreign body ingestion, or toxicosis were classified according to the obvious chief complaints and were excluded from the category of dyspnea. Each case was included in only one category of chief complaints.

For the causes of emergency visit, multiple diseases that can induce one chief complaint were identified in several cases. In those cases, all of the causes that can induce the chief complaint were included. The dogs and the cats with missed information for diagnosis due to early death, uncooperativeness, diagnostic limitation, etc., were excluded from the analysis for the cause of emergency visits. The causes were categorized as toxicosis, infections, and disorders of the major body systems such as cardiovascular, respiratory, gastrointestinal, hepatobiliary, neurologic, urologic, hematologic, musculoskeletal, reproductive, ophthalmologic, and endocrine system.

The hospital admissions were divided into the in-patient group and the out-patient group. The outcomes were classified as survival, natural death, and euthanasia at the time of leaving the emergency department.

Statistical analyses

The statistical analysis of data was performed with Excel® 2010 software (Microsoft Corp, Redmond, WA, USA). The percentages of all data were estimated to the nearest tenth of decimal place.

Results

Results of dogs

A total of 2,784 cases of dogs were included. The number of pediatric patients of age up to six months was 206 (7.4%), adult patients of age between seven months and seven years were 1,035 (37.2%), and geriatric patients of age over eight years were 1,503 (54.0%). The ages of forty cases (1.4%) were unknown.

The number of intact females was 896 (32.2%), spayed females were 619 (22.2%), intact males were 418 (15.0%), and castrated males were 842 (30.2%). The sexes of nine cases (0.3%) were not recorded.

The most common breed was Maltese (n = 703, 25.6%), fol-

Table 1. Chief complaints of emergency visits in dogs

Chief Complaints	No. of Dogs	Percentage (%)
Vomiting, diarrhea or both	633	22.7
Dyspnea	444	15.9
Trauma	273	9.8
Seizure	262	9.4
Lethargy	129	4.6
Foreign body ingestion	94	3.4
Toxicosis	68	2.4
Cough	57	2.0
Lameness	55	2.0
Dysuria, hematuria	53	1.9
Ocular signs	52	1.9
Paralysis	41	1.5
All others	623	22.4
Total	2,784	100

Table 2. Causes of emergency visits in dogs

Causes	No. of Dogs	Percentage (%)
Gastrointestinal disorders	402	18.9
Neurologic disorders	326	15.3
Cardiovascular disorders	248	11.7
Respiratory disorders	222	10.5
Urologic disorders	174	8.2
Hematologic disorders	164	7.7
Toxicosis	146	6.9
Musculoskeletal disorders	122	5.7
Reproductive disorders	101	4.8
Infectious disorders	65	3.1
Ophthalmologic disorders	63	3.0
Hepatobiliary disorders	46	2.2
Endocrine disorders	45	2.1
Total	2,124	100

lowed by Shih Tzu (417, 15.0%), Yorkshire Terrier (380, 13.6%), and Miniature or Toy poodle (230, 8.3%).

The symptoms of vomiting, diarrhea, or both (n = 633, 22.7%) were the most common chief complaints, followed by dyspnea (444, 15.9%), trauma (273, 9.8%), seizure (262, 9.4%), and lethargy (129, 4.6%) (Table 1).

The most common causes were gastrointestinal disorders (n = 402, 18.9%), followed by neurologic (326, 15.3%), cardiovascular (248, 11.7%), respiratory (222, 10.5%), urologic (174, 8.2%), and hematologic disorders (164, 7.7%) (Table 2).

The hospital admissions were 1,583 cases (56.9%), and 1,201 cases (43.1%) were treated as outpatients. For the outcomes, 2,418 cases (86.9%) were alive at the time of their leaving the emergency department. The natural deaths were 231 cases (8.3%), and 135 dogs (4.8%) were euthanized according to their owners' requests.

Table 3. Chief complaints of emergency visits in cats

Chief Complaints	No. of Cats	Percentage (%)
Dyspnea	75	18.9
Vomiting, diarrhea or both	72	18.1
Trauma	48	12.1
Dysuria	47	11.9
Lethargy	43	10.9
Seizure	11	2.8
Paralysis	10	2.5
Foreign body ingestion	8	2.0
Lameness	7	1.8
Anorexia	7	1.8
Ocular signs	6	1.5
Toxicosis	3	0.8
All others	59	14.9
Total	396	100

Table 4. Causes of emergency visits in cats

Diagnosis	No. of Cats	Percentage (%)
Urologic disorders	61	23.5
Gastrointestinal disorders	43	16.5
Respiratory disorders	42	16.2
Infectious disorders	30	11.5
Cardiovascular disorders	22	8.5
Musculoskeletal disorders	14	5.4
Hepatobiliary disorders	14	5.4
Neurologic disorders	11	4.2
Hematologic disorders	10	3.8
Ophthalmologic disorders	4	1.5
Endocrine disorders	4	1.5
Toxicosis	3	1.2
Reproductive disorders	2	0.8
Total	260	100

Results of cats

A total of 396 cases of the cats were included. The number of pediatric patients of age up to six months was 57 (14.4%), adult patients of age between seven months and eleven years were 305 (77.0%), and geriatric patients of age over twelve years were 15 (3.8%). The ages of nineteen cases (4.8%) were unknown.

The sex distribution was divided into four groups. The number of intact females was 78 (19.7%), spayed females were 86 (21.7%), intact males were 59 (14.9%) and castrated males were 154 (38.9%). The sexes of nineteen cases (4.8%) were not recorded.

The most common breed was Domestic shorthair ($n = 168$, 42.4%), followed by Persian (47, 11.9%), Turkish Angora (39, 9.8%), and Siamese (24, 6.0%).

The dyspnea ($n = 75$, 18.9%) was the most common chief

complaint, followed by vomiting, diarrhea, or both (72, 18.1%), trauma (48, 12.1%), dysuria (47, 11.9%), and lethargy (43, 10.9%) (Table 3).

The most common causes were urologic disorders ($n = 61$, 23.5%), followed by gastrointestinal (43, 16.5%), respiratory (42, 16.2%), infectious (30, 11.5%) and cardiovascular disorders (22, 8.5%) (Table 4).

The hospital admissions were 205 cases (51.8%), and 191 cases (48.2%) were treated as outpatients. For the outcome, 324 cases (81.8%) were alive at the time of their leaving the emergency department. Natural deaths were 42 cases (10.6%), and 30 cats (7.6%) were euthanized according to their owners' requests.

Discussion

Through this retrospective study, characteristics of the veterinary emergency visits in South Korea can be identified. For the species distribution, the dogs ($n = 2,784$, 87.5%) were much more commonly visited than the cats ($n = 396$, 12.5%). The age and gender differences among the dogs and the cats visiting the emergency department have been revealed.

For the age groups, geriatric patients were predominant in dogs, but adult patients were predominant in cats. The dominant age group was unchanged by adjusting the age range of adult cats with the age range of the adult dogs. Although some frequently encountered age-related emergency diseases such as cardiogenic pulmonary edema induced by mitral valve insufficiency mainly occur in dogs, this alone does not fully explain the difference in dominant age group between the dogs and the cats. In South Korea, it has been less than 10 years since cats began to gain popularity as companion animals, and the percentage of geriatric cats is low in general veterinary visits. The result of present study may reflect feline population in South Korea. In Europe, where cats have been living as companion animals for a long time, the percentage of geriatric cats increases more rapidly than dogs (6). Additional long-term study should be done for more reliable age distribution of cats that visited the emergency department.

In sex distribution, females were dominant to males in dogs, and males were dominant to females in cats. The high frequency of urologic disorders in cats, including feline lower urinary tract disease, is more common in male cats and this could be related to the sex distribution (3). The breed distribution in both dogs and cats corresponded with general veterinary visits in the hospital.

The symptoms of vomiting, diarrhea, or both, dyspnea, and trauma were most frequently encountered chief complaints at the emergency department both in dogs and cats, and these composed about 48.6% of all the cases (48.5% in dogs and 49.2% in cats). The seizure was relatively common chief complaint in dogs but not in cats. This result is consistent with the previous study that estimated the lifetime seizure frequencies as 0.5% to 5.7% in dogs and 0.5% to 1.0% in cats (7). The foreign body ingestion and toxicosis were also

relatively common chief complaints in dogs but not in cats. In the previous study, dogs were the most commonly poisoned species, and the same result was identified in this study as expected (2). Dysuria was relatively common chief complaint in cats but not in dogs.

Commonly diagnosed disorders differed according to the species. The gastrointestinal, cardiovascular, and respiratory disorders were commonly diagnosed both in dogs and cats. The neurologic, hematologic, reproductive disorders and toxicity were common in dogs but not in cats. The urologic and infectious disorders were common in cats but not in dogs. The urologic disorders were most commonly diagnosed in cats, and this could be due to high recurrence rate of the feline lower urinary tract disease (12). The ophthalmologic and endocrine disorders were uncommon both in dogs and cats.

The hospital admission rate was higher in the cats. This could be related to general characteristic of cats of hiding symptoms, which lead to more critical condition by the time they come to the emergency department. But in this study, the severities of cases were not analyzed, so there could be some other reasons that resulted in different hospital admission rate. The survival rates were 86.9% in dogs and 81.8% in cats. There are no reports about survival rates in the emergency department, so comparison could not be made until now.

The minimum requirements in providing veterinary emergency service in South Korea can be suggested based on the results of this study. The common chief complaints and the causes of emergency visits identified through this study, such as dyspnea, trauma, cardiovascular disorders, and respiratory disorders may lead to hypotension, hypoxemia, metabolic derangements, and electrolyte abnormalities that can be common causes of cardiopulmonary arrest (4). To perform efficient cardiopulmonary resuscitation while taking care of other emergency patients simultaneously, at least 3 staffs including 1 veterinarian with knowledge of emergency and critical care medicine are required (9). The staffs should be well trained for the emergency procedures, cardiopulmonary resuscitation, and emergency surgery. Based on the same reasons described above, the emergency facilities should be equipped with supplementary oxygen, endotracheal tube, Ambu bag, monitoring devices such as electrocardiography, pulse oximetry and blood pressure monitor, sterilized surgical instruments (surgical pack), crystalloids, colloids, blood products, emergency drugs, anesthetics, analgesics, and other medical supplies for emergency procedures. The emergency facilities should have the capacity to perform laboratory tests for minimal database, radiography, ultrasonography, and endoscopy to diagnose and treat the emergency patients according to the common chief complaints revealed through this study.

The minimum requirements suggested in this study are similar to the guidelines of the minimum requirements for veterinary emergency and critical care facilities which is previously provided by Veterinary Emergency and Critical Care Society (1). This result reflects the unique characteristics of emergency and critical care medicine, in spite of the distinct

clinical environment in South Korea.

The limitations of this study are mainly its retrospective nature. Some of the medical records were not complete. In this study, the valuable information such as triage records could not be collected. The short research period and referral hospital setting could also be limitations of this study. The extensive statistical analyses of multiple emergency facilities are needed for more applicable information. Furthermore, studies to identify common underlying diseases of each frequent chief complaint are required to provide more effective guidelines for veterinary emergency service.

Conclusions

In this retrospective study, the frequently encountered chief complaints and the causes of veterinary emergency visits were identified. The symptoms of vomiting, diarrhea, dyspnea, and trauma were most frequently encountered chief complaints at the emergency department both in dogs and cats. The gastrointestinal, neurologic, and cardiovascular disorders were common causes of emergency visits in dogs and urologic, gastrointestinal, and respiratory disorders were common causes in cats. Through this study, the minimal requirements for veterinary emergency clinics in South Korea can be suggested.

References

1. Anon. Minimum requirements for certification of veterinary emergency and critical care facilities [Internet]. *Vet Emerg Crit Care Soc*. 2013. Available from: <http://www.veccs.org>.
2. Berny P, Caloni F, Croubels S, Sachana M, Vandenbroucke V, Davanzo F, Guitart R. Animal poisoning in Europe. Part 2: Companion animals. *Vet J* 2010; 183: 255-259.
3. Cameron ME, Casey RA, Bradshaw JW, Waran NK, Gunn-Moore DA. A study of environmental and behavioural factors that may be associated with feline idiopathic cystitis. *J Small Anim Pract* 2004; 45: 144-147.
4. Cole SG. Cardiopulmonary resuscitation. In: *Small animal critical care medicine*, 1st ed. Philadelphia: Saunders. 2009: 14-21.
5. Dugdale A. Geriatrics. In: *Veterinary anaesthesia principles to practice*, 1st ed. Ames: Blackwell Publishing. 2010: 315-317.
6. Kraft W. Geriatrics in canine and feline internal medicine. *Eur J Med Res* 1998; 3: 31-41.
7. LeCouteur RA, Child G. Clinical management of epilepsy of dogs and cats. *Probl Vet Med* 1989; 1: 578-595.
8. McMichael M. Critically ill pediatric patients. In: *Small animal critical care medicine*, 1st ed. Philadelphia: Saunders. 2009: 747-751.
9. McMichael M, Herring J, Fletcher DJ, Boller M. RECOVER evidence and knowledge gap analysis on veterinary CPR. Part 2: Preparedness and prevention. *J Vet Emerg Crit Care* 2012; 22: S13-25.
10. Niska RW, Bhuiya F, Xu J. National hospital ambulatory medical care survey: 2007 emergency department summary. *Natl health stat report* 2010; 26: 1-31.
11. Pitts SR, Niska RW, Xu J, Burt CW. National hospital

ambulatory medical care survey: 2006 emergency department summary. Natl health stat report 2008; 7: 1-38.

12. Willeberg P. Epidemiology of naturally occurring feline

urologic syndrome. Vet Clin North Am Small Anim Pract 1984; 14: 455-469.

응급실에 내원하는 개와 고양이의 주증과 원인에 대한 후향분석: 3,180례

이혜경*** · 손원균** · 서지민* · 김현욱* · 이인형**1

*해마루동물병원, **서울대학교 수의과대학

요 약 : 본 연구는 응급실에 내원하는 개와 고양이의 흔한 주증과 원인을 파악하고, 응급진료를 제공하는 한국의 응급 동물병원에 필요한 최소한의 준비 사항을 제안하고자 실시되었다. 해마루 이차진료 동물병원의 응급실에 2012년 3월부터 2013년 8월 사이에 내원한 2,368마리의 개와 347마리의 고양이를 대상으로 진료 기록을 분석하였다. 그 중, 255마리의 개와 35마리의 고양이는 두 번 이상 응급실에 내원하였으며, 이들은 각각의 내원을 하나의 증례로 취급하였다. 따라서 개에서 총 2,784증례와 고양이에서 396증례를 분석하였다. 진료 기록에서는 품고, 주증, 진단, 입원 여부, 생존 여부를 분석하였다. 개의 주증으로는 구토, 설사 혹은 두 가지 모두인 경우가 가장 많았으며, 다음으로는 호흡곤란, 외상, 발작, 기력저하 순이었다. 개에서 가장 많이 진단된 질환은 소화기계 질환이었으며, 그 다음으로는 신경계 질환, 심혈관계 질환, 호흡기계 질환, 비뇨기계 질환, 혈액 질환 순이었다. 고양이에서의 주증으로는 호흡곤란이 가장 많았으며, 다음으로는 구토, 설사 혹은 두 가지 모두, 외상, 배뇨곤란, 기력저하 순이었다. 고양이에서 가장 많이 진단된 질환은 비뇨기계 질환이었으며, 그 다음으로는 소화기계 질환, 호흡기계 질환, 감염성 질환, 심혈관계 질환 순이었다. 본 연구의 결과에 따르면, 구토, 설사 혹은 두 가지 모두와 호흡곤란, 외상이 개와 고양이 모두에서 가장 흔하게 접하는 주증이었으며, 이 세가지가 전체 증례의 주증 중에서 약 48.6%를 차지하였다. 하지만 흔히 진단되는 질환은 중간 차이를 보였다. 본 연구의 결과를 토대로, 응급한 환자를 진단하고 안정시킬 수 있는 적절한 응급 진료를 제공하기 위해서 필요한 최소 준비 사항은 충분한 지식을 갖춘 숙련된 인력과 응급 처치와 진단이 가능한 시설을 갖추는 것임을 확인할 수 있었다.

주요어 : 응급, 주증, 후향분석, 개, 고양이