



저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.



비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.



변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#)

**A DISSERTATION FOR THE DEGREE OF MASTER**

**Retrospective Analysis of Chief Complaints  
and Causes of Dogs and Cats during  
Emergency Visits**

응급실에 내원하는 개와 고양이의  
주증과 원인에 대한 회고분석

**By**

**Hyekyung Lee**

이혜경

**Department of Veterinary Medicine  
Graduate School  
Seoul National University**

**2014. 2.**

**Retrospective Analysis of Chief Complaints  
and Causes of Dogs and Cats during  
Emergency Visits**

By  
**Hyekyung Lee**

Supervised by  
Professor Inhyung Lee

Thesis

Submitted to the Faculty of the Graduate School  
of Seoul National University  
in Partial Fulfillment of the Requirements  
for the Degree of Master in Veterinary Medicine

October, 2013

Major in Veterinary Surgery  
Department of Veterinary Medicine  
Graduate School  
Seoul National University

December, 2013

# **Retrospective Analysis of Chief Complaints and Causes of Dogs and Cats during Emergency Visits**

Advisor: Prof. Inhyung Lee

Submitting a master's thesis of veterinary surgery

October 2013

Graduate School of Seoul National University

Veterinary Surgery, Department of Veterinary Medicine

**Hyekyung Lee**

Confirming the master's thesis written by Hyekyung Lee

December 2013

Chair            Kangmoon Seo

Vice Chair     Inhyung Lee

Examiner       Yongbaek Kim

# **Retrospective Analysis of Chief Complaints and Causes of Dogs and Cats during Emergency Visits**

**Advisor: Prof. Inhyung Lee**

**Hyekyung Lee**

Department of Veterinary Medicine  
Graduate School  
Seoul National University

## **Abstract**

This study was performed to investigate frequent chief complaints and causes in dogs and cats visited to an emergency department, and to suggest minimum requirements for veterinary emergency clinics in South Korea.

The medical records of 2,368 dogs and 347 cats visited to the emergency department of Haemaru Referral Animal Hospital from March 2012 to August 2013 were reviewed. 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. Signalment, chief complaints, diagnoses, hospital admission, outcome were analyzed.

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, 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 most frequently encountered chief complaints at the emergency department both in dogs and cats, accounting for approximately 48.6% of all cases. However common causes were differed between dogs and 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, cause, dog, cat

**Student number:** 2011-21674

# CONTENTS

INTRODUCTION .....	1
MATERIALS AND METHODS .....	3
1. Animals .....	3
2. Data analysis process .....	3
3. Statistical analyses .....	4
RESULTS .....	5
1. Results of dogs .....	5
2. Results of cats .....	12
DISCUSSION .....	19
CONCLUSIONS .....	24
REFERENCES .....	25
ABSTRACT IN KOREAN .....	28

# INTRODUCTION

Many dogs and cats visit emergency clinics with various symptoms and diseases. To stabilize these patients, veterinary facilities that provide emergency and critical patient care need to meet or exceed minimum requirements. Although there is a guideline of minimum requirements for veterinary emergency and critical care facilities which is provided by Veterinary Emergency and Critical Care Society (VECCS) (Anon., 2013), it is not easy for most of general veterinary practitioners in South Korea to meet the guideline because of different clinical environment.

Because minimum requirements for emergency and critical care facilities are needed to efficiently save as many patients as possible, it is essential to know what are the frequent chief complaints and causes in dogs and cats visited to the emergency clinic in order to propose proper minimum requirements. In human medicine, there are annual reports with statistics on visits to hospital emergency department (Niska *et al.*, 2010; Pitts *et al.*, 2008). However, there is no available report that shows the characters of emergency visits in veterinary medicine.

Therefore, the purpose of this retrospective study was to identify frequent chief complaints and causes in dogs and cats visited to an



emergency clinic, which could be provided as a reference to suggest minimum requirements of the emergency clinics for emergency service in South Korea.

# **MATERIALS AND METHODS**

## **Animals**

Dogs and cats 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 one time 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 signalment, chief complaints, diagnoses, hospital admission and outcome. For age, original data were categorized as pediatric, adult and geriatric. Animals from birth to 6 months of age were categorized as pediatric both in dogs and cats (McMichael, 2009). Dogs between 7 months and 7 years of age, and cats between 7 months and 11 years of age were categorized as adult. Dogs aged over 8 years and cats aged over 12 years were categorized as geriatric (Dugdale, 2010). 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, traumas with various symptoms were recorded as trauma, lethargy with no other symptoms were regarded as lethargy, and dyspneic patients with other obvious chief complaints such as trauma, seizure, major gastrointestinal sign, foreign body ingestion or toxicosis were excluded from the category of dyspnea. Each case was included in only one category of chief complaints. For causes of emergency visit, multiple diseases which could induce the chief complaint of one case were identified in several cases. In those cases, all of the causes which could induce the chief complaint were included. Causes were categorized as toxicosis, infectious and disorders of major body systems such as cardiovascular, respiratory, gastrointestinal, hepatobiliary, neurologic, urologic, hematologic, musculoskeletal, reproductive, ophthalmologic, and endocrine system. Hospital admission was divided into inpatient and outpatient. Outcome was classified as survival, natural death and euthanasia at the time of leaving the emergency department.

### **Statistical analyses**

Statistical analysis of data was performed with Excel 2010 software (Microsoft Corp, Redmond, WA, USA). The percent of all data was rounded off the numbers to the first decimal places.

# RESULTS

## Results of dogs

A total of 2,784 cases of dogs were included. The number of pediatric patients aged up to six months were 206 (7.4%), adult patients aged between seven months and seven years were 1,035 (37.2%) and geriatric patients aged over eight years were 1,503 (54.0%) (Figure 1). The ages of forty cases (1.4%) were unknown. The numbers of intact females were 896 (32.2%), spayed females were 619 (22.2%), intact males were 418 (15.0%) and castrated males were 842 (30.2%) (Figure 2). The sexes of nine cases (0.3%) were not recorded. The breed distribution of dogs are summarized in Table 1. Most common breed was Maltese (703, 25.6%), followed by Shih Tzu (417, 15.0%), Yorkshire Terrier (380, 13.6%) and miniature or toy poodle (230, 8.3%) (Table 1).

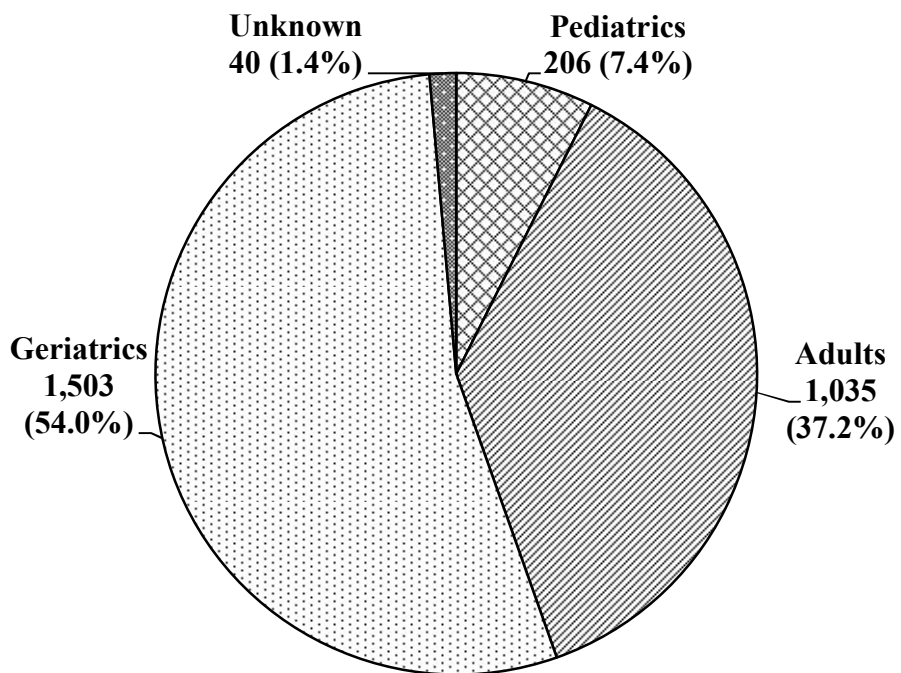


Figure 1. The age distribution of dogs visited to the emergency department

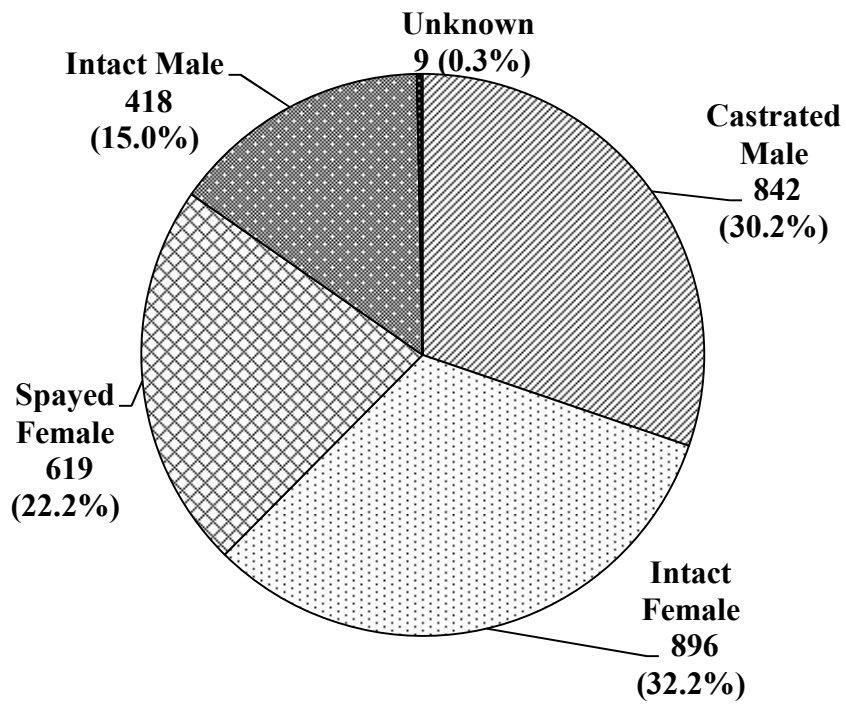


Figure 2. Sex distribution of dogs visited to the emergency department

Table 1. The breed distribution in dogs visited to the emergency department

Breeds	Numbers of dogs	Percentage (%)
Maltese	703	25.6
Shih Tzu	417	15.0
Yorkshire Terrier	380	13.6
Poodle (miniature, toy)	230	8.3
Mixed	159	5.7
Pomeranian	145	5.2
Miniature Schnauzer	139	5.0
Cocker Spaniel	137	4.9
Pekingese	92	3.3
Chihuahua	61	2.2
Mixed	159	5.7
All others	321	11.5
<b>Total</b>	<b>2,784</b>	<b>100</b>

Vomiting, diarrhea or both (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 2).

The most common causes were gastrointestinal disorders (402), followed by neurologic (326), cardiovascular (248), respiratory (222), urologic (174) and hematologic disorders (165) (Table 3).

Hospital admission were 1,583 cases (56.9%) and 1,201 cases (43.1%) were treated as outpatients. For the outcome, 2,418 cases (86.9%) were alive at the time of leaving the emergency department. Natural deaths were 231 cases (8.3%) and 135 dogs (4.8%) were euthanized according to owners' request.



Table 2. Chief complaints of emergency visits in dogs

Chief Complaints	Numbers 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 3. Causes of emergency visits in dogs

Causes	Numbers 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
Hepatobilliary disorders	46	2.2
Endocrine disorders	45	2.1
Total	2,124	100

## **Results of cats**

A total of 396 cases of cats were included. The number of pediatric patients aged up to six months were 57 (14.4%), adult patients aged between seven months and eleven years were 305 (77.0%) and geriatric patients aged over twelve years were 15 (3.8%). The ages of nineteen cases (4.8%) were unknown (Figure 3). The sex distribution was divided into four groups. The numbers of intact females were 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 (Figure 4). The breed distribution of cats is summarized in Table 4. Most common breed was Domestic shorthair (168, 42.4%), followed by Persian (47, 11.9%), Turkish Angora (39, 9.8%) and Siamese (24, 6.0%).

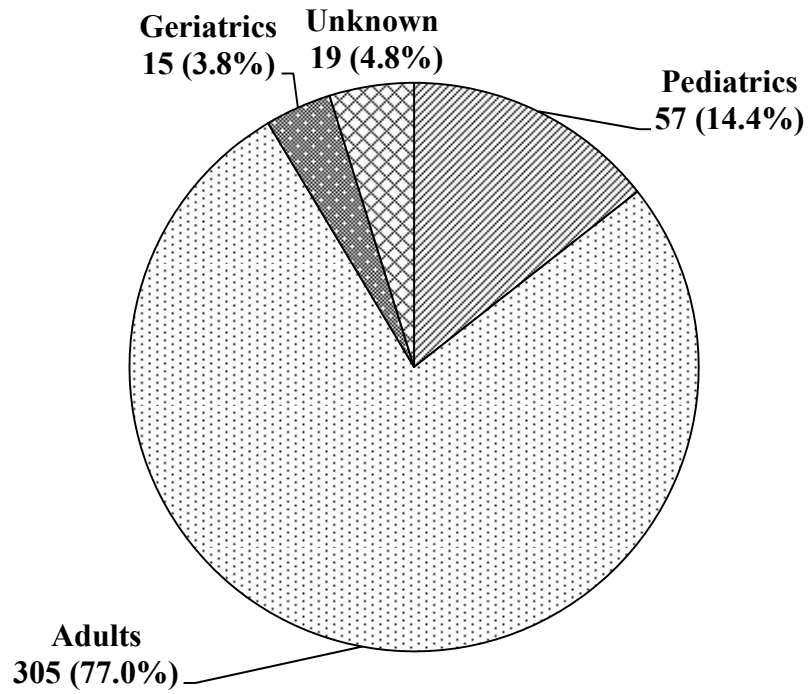


Figure 3. The age distribution in cats visited to the emergency department

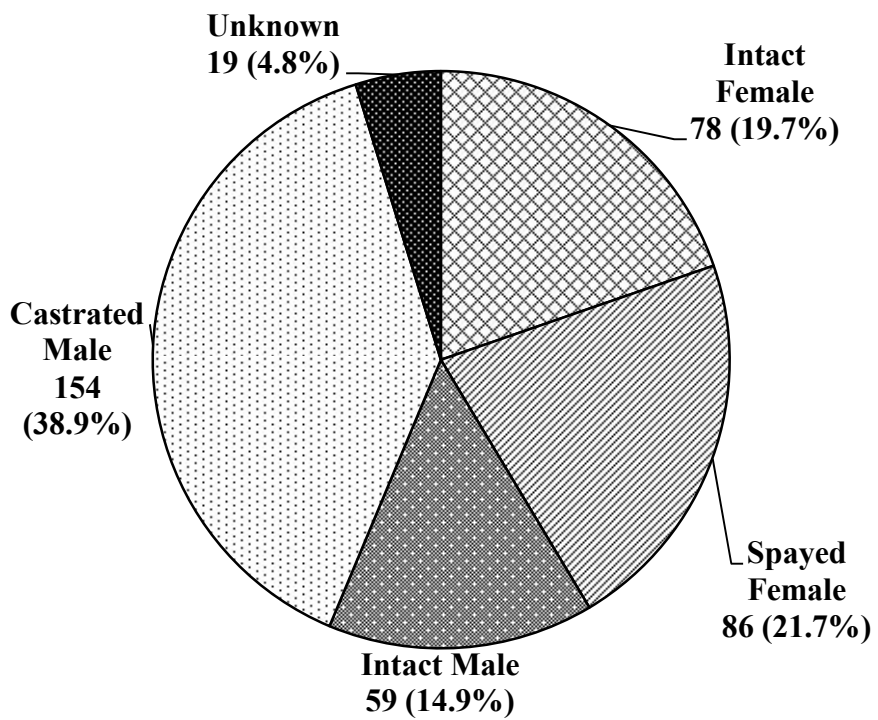


Figure 4. The sex distribution in cats visited to the emergency department

Table 4. The breed distribution in cats visited to the emergency department

Breeds	Numbers of cats	Percentage (%)
Domestic shorthair	168	42.4
Persian	47	11.9
Turkish Angora	39	9.8
Siamese	24	6.0
Abyssinian	18	4.5
Scottish fold	17	4.3
Russian blue	16	4.0
Norwegian forest cat	9	2.3
Bengal	7	1.8
Chinchilla	7	1.8
American shorthair	6	1.5
Mixed	11	2.8
All others	27	6.8
<b>Total</b>	<b>396</b>	<b>100</b>

Dyspnea (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 5).

The most common causes were urologic disorders (61), followed by gastrointestinal (43), respiratory (42), infectious (30) and cardiovascular disorders (22) (Table 6).

Hospital admission 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 leaving the emergency department. Natural deaths were 42 cases (10.6%) and 30 cats (7.6%) were euthanized according to owners' request.

Table 5. Chief complaints of emergency visits in cats

Chief Complaints	Numbers 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 6. Causes of emergency visits in cats

Diagnosis	Numbers 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

## DISCUSSION

Through this retrospective study, character of veterinary emergency visits in South Korea could be identified. For the species distribution, 2,784 (87.5%) cases were dogs and 396 (12.5%) cases were cats. The age and gender differences in dogs and cats visited to the emergency department have been revealed. In 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 to be the same as 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 dogs and cats. In South Korea, it has been less than 10 years that 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 which cats have been lived as companion animals for long time, percentage of geriatric cats increased more rapidly than dogs (Kraft, 1998). Additional long-term study would be warranted for more reliable age distribution of cats visited to the emergency department. In sex distribution, females were more than male

dogs, and males were more than female cats. In cats, high frequency of urologic disorders including feline lower urinary tract disease which is more common in male cats could be related in this sex distribution (Cameron *et al.*, 2004). The breed distribution corresponded with general veterinary visits in the hospital both in dogs and cats.

Vomiting, diarrhea or both, dyspnea and trauma were most frequently encountered chief complaints at the emergency department both in dogs and cats, and these were about 48.6% of all cases (48.5% in dogs and 49.2% in cats). Seizure was relatively common chief complaint in dogs but not in cats. This result is consistent with previous study that estimates of lifetime seizure frequencies are 0.5% to 5.7% in dogs and 0.5% to 1.0% in cats (LeCouteur and Child, 1989). Foreign body ingestion and toxicosis were also relatively common chief complaints in dogs but not in cats. In previous study, dogs were the most commonly poisoned species and in this study, same result was identified as expected (Berny *et al.*, 2010). Dysuria was relatively common chief complaint in cats, but not in dogs.

Commonly diagnosed disorders were differed according to the species. Gastrointestinal, cardiovascular and respiratory disorders were commonly diagnosed both in dogs and cats. Neurologic, hematologic, reproductive disorders and toxicity were common in dogs, but not in cats. Urologic and infectious disorders were common in cats, but not in dogs. Urologic

disorders were most commonly diagnosed in cats and this could be due to high recurrence rate of feline lower urinary tract disease (Willeberg, 1984). Ophthalmologic and endocrine disorders were uncommon both in dogs and cats.

Hospital admission rate was higher in cats. This could be related to general character of cats that hide symptoms which made more critical condition when cats visit the emergency department. But in this study, the severities of cases were not analyzed, so there could be some other reasons that result in different hospital admission rate. Survival rates were 86.9% in dogs and 81.8% in cats. There is no report about survival rate in emergency department so comparison could not be done till now.

Based on the results of this study, minimum requirements to provide veterinary emergency service in South Korea could be suggested. Common chief complaints and causes during 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 could be common causes of cardiopulmonary arrest (Cole, 2009). To perform efficient cardiopulmonary resuscitation and take care of other emergency patients simultaneously, at least 3 staffs including 1 veterinarian with knowledge of emergency and critical care medicine are required (McMichael *et al.*,

2012). The staffs should be well trained for emergency procedures, cardiopulmonary resuscitation and emergency surgery. Based on the same reason described above, the emergency facilities should be equipped with supplementary oxygen, endotracheal tube and 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 medical supplies for emergency procedures. The facilities should have the capacity to perform laboratory tests for minimal database, radiography, ultrasonography and endoscopy to diagnose and treat the emergency patients which visit emergency clinic with common chief complaints revealed through this study.

The minimum requirements suggested in this study were similar to the guideline of minimum requirements for veterinary emergency and critical care facilities which is previously provided by Veterinary Emergency and Critical Care Society (VECCS) (Anon., 2013). This result reflects the unique characteristics of emergency and critical care medicine in spite of the distinct clinical environment in South Korea.

Limitations of the study are mainly its retrospective nature. Some of medical records were not complete. In this study, some valuable information such as triage records could not be collected. Short research

period and referral hospital setting could be also limitations of this study. Extensive statistical analyses of multiple emergency facilities are warranted for more applicable data. 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, frequently encountered chief complaints and causes of veterinary emergency visits were identified. Vomiting, diarrhea, dyspnea and trauma were most frequently encountered chief complaints at the emergency department both in dogs and cats. Gastrointestinal, neurologic and cardiovascular disorders were common causes of emergency visits in dogs and urologic, gastrointestinal and respiratory disorders were common causes in cats. Similarities and differences in character of emergency visits between dogs and cats were also identified. Through this study, minimal requirements for veterinary emergency clinics in South Korea could be suggested.

## REFERENCES

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>.

Berny P, Caloni F, Croubels S *et al*. Animal poisoning in Europe. Part 2: Companion animals. *Vet J* 2010; 138: 255-259.

Cameron ME, Casey RA, Bradshaw JW *et al*. A study of environmental and behavioural factors that may be associated with feline idiopathic cystitis. *J Small Anim Pract* 2004; 45: 144-147.

Cole SG. Cardiopulmonary resuscitation. In: Silverstein D, Hopper K (eds). *Small animal critical care medicine*. Philadelphia: Saunders; 2009. pp. 14-21.

Dugdale A. Geriatrics. In: Dugdale A (ed). *Veterinary anaesthesia principles to practice*. Ames: Blackwell Publishing; 2010. pp. 315–317.



Kraft W. Geriatrics in canine and feline internal medicine. *Eur J Med Res* 1998; 3: 31-41.

LeCouteur RA, Child G. Clinical management of epilepsy of dogs and cats. *Probl Vet Med* 1989; 1: 578-595.

McMichael M. Critically ill pediatric patients. In: Silverstein D, Hopper K. (eds). *Small animal critical care medicine*. Philadelphia: Saunders; 2009. pp. 747-751.

McMichael M, Herring J, Fletcher DJ *et al*. RECOVER evidence and knowledge gap analysis on veterinary CPR. Part 2: Preparedness and prevention. *J Vet Emerg Crit Care* 2012; 22: S13–S25.

Niska RW, Bhuiya F, Xu J. National hospital ambulatory medical care survey: 2007 emergency department summary. *National health statistics reports*; no 26. Hyattsville: National center for health statistics 2010.

Pitts SR, Niska RW, Xu J *et al*. National hospital ambulatory medical care survey: 2006 emergency department summary. *National health statistics reports*; no 7. Hyattsville: National center for health statistics 2008.

Willeberg P. Epidemiology of naturally occurring feline urologic syndrome. *Vet Clin North Am Small Anim Pract* 1984; 14: 455-469.

# 국 문 초 록

## 응급실에 내원하는 개와 고양이의 주증과 원인에 대한 회고분석

지도 교수: 이 인 형

서울대학교 대학원  
수의학과 수의외과학 전공  
이 혜 경

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 633증례로 가장 많았으며, 다음으로는 호흡곤란(444), 외상(273), 발작(262), 기력저하(129) 순이었다. 개에서 가장 많이 진단된 질환은 소화기계 질환(402)이었으며, 그 다음으로는 신경계 질환(326), 심혈관계 질환(248), 호흡기계 질환(222), 비뇨기계 질환(174), 혈액 질환(165) 순이었다. 고양이에서의 주증으로는 호흡곤란이 75증례로 가장 많았으며, 다음으로는 구토, 설사 혹은 두 가지 모두(72), 외상(48), 배뇨곤란(47), 기력저하(43) 순이었다. 고양이에서 가장 많이 진단된 질환은 비뇨기계 질환(61)이었으며, 그 다음으로는 소화기계 질환(43), 호흡기계 질환(42), 감염성 질환(30), 심혈관계 질환(22) 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, 원인, 개, 고양이

**학 번:** 2011-21674