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Original Article

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Abstract

The present study was performed to assess the prevalence of the most common appendicular fractures in dogs and cats. Medical records of 190 animals (134 cats and 56 dogs) were reviewed. Of all, 91 cases (53 cats and 38 dogs) were diagnosed with appendicular fracture. The fractures were significantly higher in dogs than in cats (p<0.01), 67.8% and 39.5% of total cases respectively. In dogs, the pelvic limb affections were significantly more frequent than those in shoulder limb (p<0.001), 28/38 and 10/38 cases respectively. Tibiofibular and pelvic bone fractures were significantly more frequent than metatarsal bone (p< 0.001 and p<0.01 respectively). Similarly, in cats, fractures in the pelvic limb were significantly higher than that in shoulder limb (p<0.01), 46/53 and 7/53 cases respectively. In both species, femoral bone was the most affected location (19/46 cases) and the frequency of femoral bone fracture (19/46 cases) was significantly higher than tibiofibular bone fracture (9/46 cases) (p<0.01) and metatarsal bone fracture (1/46 cases) (p<0.01). The result of the present study indicates that traumatic injuries are the most common affections in dogs and cats in Tripoli. Further epidemiological studies are needed to explore the risk factors associated with such a high prevalence of affections.

Keywords: Dogs, cats, appendicular fracture, prevalence, radiography, tripoli, Libya.

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Introduction

Orthopedic diseases are common in dogs and cats including, especially, those caused by traumatic injuries (Piermattei et al., 2006; Scott and McLaughlin 2007). Early interest has been given to dogs and cats with such injuries (Rodkey 1980; Kolata 1980). Approximately 35% of dogs and cats examined in large veterinary hospitals were for evaluation of injuries, with an overall mortality rate of about 9% from either spontaneous death or euthanasia (Kolata 1980). The management of animal's environment by the owner could play an important role in the prevalence of animal injury. Factors that influence the outcome of a traumatic event include the cause of injury, the amount of distribution of kinetic energy discharged into the animal, and the anatomic location of the injury (McCartney et al., 2006; Harasen 2009), in addition to bone abnormalities resulting from nutritional deficiencies or toxicosis. The veterinarian's role in dealing with trauma should not only be restricted to emergency resuscitation and definitive treatment of injured animals but also to educate pet owners to the common environmental hazards that could affect their pets.

Classification of appendicular fractures was extensively discussed (Harari 2002; Lanz, 2002). The most common type of appendicular fracture in dogs and cats was the femur and tibia (Harasen 2009). Distal femoral physis Fractures was also an important site for fracture (Harasen 2001; Nolte et al., 2005). Nowadays in Libya, in spite of increasing number of pets, orthopedic diseases in dogs and cats receive a little attention. The possible reason is that radiographic imaging is not practiced as routine examination in orthopedic diseases of dogs and cats in veterinary clinics. Moreover, to our knowledge, the prevalence of those affections amongst small animals in Libya has never been studied. Therefore, the aim of the present study was to classify and investigate the prevalence of appendicular fractures in dogs and cats in the region of Tripoli.

Materials and Methods

Animals and Study Overview

A retrospective analysis of clinical and radiographic records of dogs and cats presented with appendicular fracture during the period from April to December 2013 was carried out. A total of 190 pet animals (134 cats; 56 dogs) with different ages, breeds and gender were admitted to the Veterinary Teaching Hospital, University of Tripoli, Libya. All animals were owned by residents in Tripoli.

History and Clinical Examination

Complete clinical history and physical examination of admitted animals were performed according to the previously described methods (Denny 1993; Leonard 2001). Firstly, posture, gait and evidence of swelling were assessed by inspection. Then, clinical findings associated with fracture were also evaluated before radiographic examination.

Radiographic Examinations

Radiographic examination of each animal was performed according to established methods (Thrall 2013). Prior to radiographic examination, the animal was sedated using a light dose of xylazine 2% (Xyla, interchemie, Holand). The animal was then positioned on a specific table under a mobile radiography machine (ACEM, Bologna, Italy), on either lateral, dorsal or sternal recumbency according to the affected part of appendicular skeleton. Appropriate exposure factors were selected based on the thickness of the affected part. The radiographic films were then processed using an automatic film processor (Optimax, Protec Medizintechnik GmbH& Co., Germany). The radiographs were then read and interpretated by veterinary radiologists and a radiology report was prepared and archived with the related radiographs.

Statistical Analysis

Data analysis was performed using Graphpad Prism for windows statistical analysis software (version 5.0, GraphPad Software Inc., San diego, CA, USA). Chi-square (Fishers exact test) was used

to evaluate the prevalence of affections in both animal species. Results were considered significant at $p<0.05$.

Results

Among the admitted cases, 38 dogs and 53 cats were showing appendicular fracture. Such affections were the most prevalent among all affections. The affections were significantly higher in dogs than in cats ($p<0.01$), 67.8% and 39.5 respectively. (Figure 1).

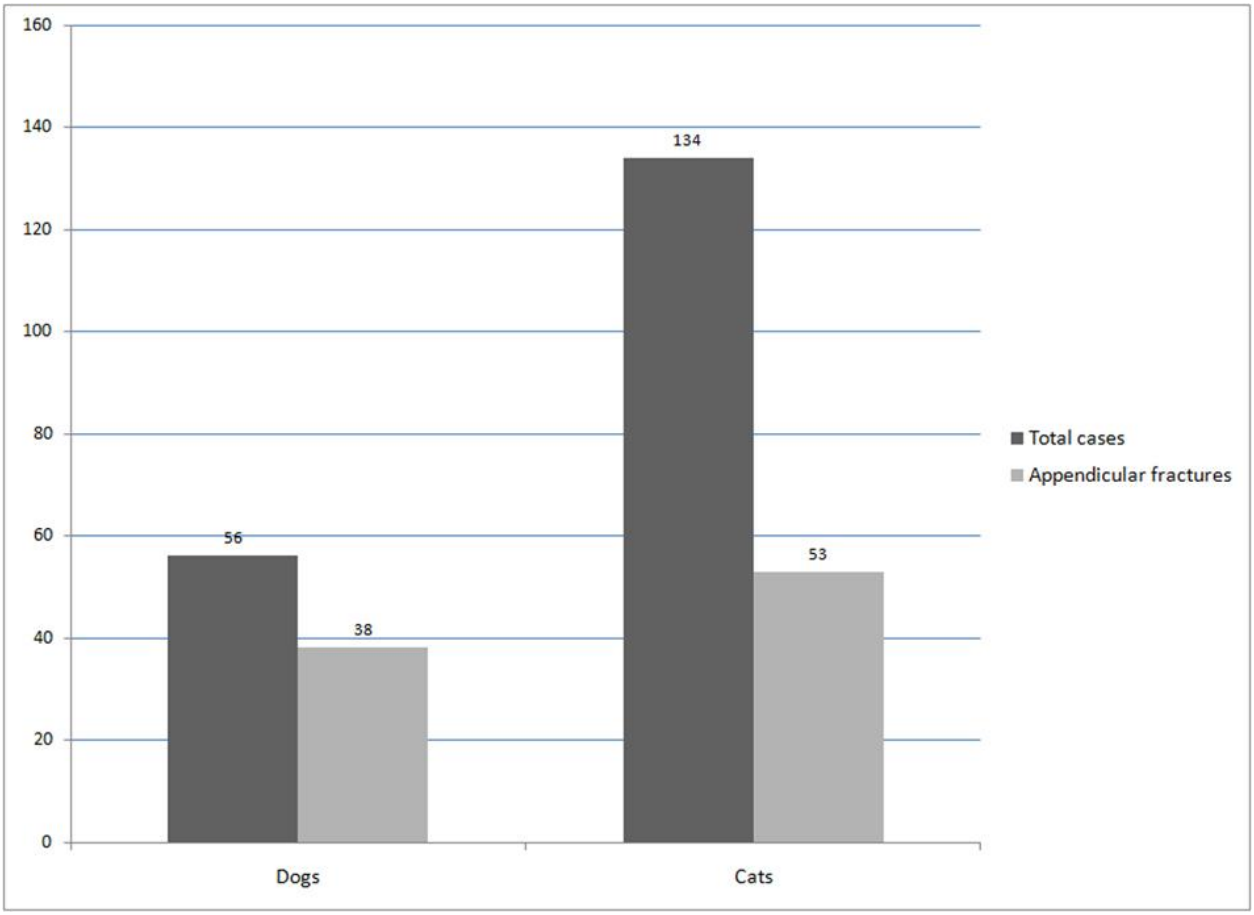

Fig. 1: The number of cases diagnosed with appendicular fractures in dogs and cats in relation to the total number of admitted cases.

In dogs, the pelvic limb affections were significantly more frequent than shoulder limb ($p<0.001$) (28/38 vs 10/38) (Table 1). Affections of the pelvic limb were fractures in pelvic bone (9/28), femoral bone (7/28), tibiofibular bone (11/28) and metatarsal bone (1/28). Tibiofibular and pelvic bone affections were significantly ($p< 0.001$ and $p<0.01$, respectively) more frequent than metatarsal bone (Figure 3, 4). However, in the shoulder limb, other affections including radius and ulna (6/10), thoracic bone (2/10), humerus (1/10) and metacarpal bone (1/10) had no significant variation (Table 2).

Table 1: Distribution of total cases of appendicular fractures in dogs and cats.

Affection	Cats (n=53)	Dogs (n=38)
Shoulder limb		
Thoracic bone	0 (0%)	2 (5.26%)
Humerus	5 (9.43%)	1(2.63%)
Radius and ulna	1 (1.88%)	6 (15.78%)

Metacarpal	1 (1.88%)	1 (2.63%)
Pelvic limb		
Pelvic bone	17 (32.07%)	9 (23.68%)
Femoral bone	19 (35.84%)	7 (18.42%)
Tibia and fibula	9 (16.98%)	11(28.945)
Metatarsal	1 (1.88%)	1 (2.63%)

Fig. 3: Selected Medio-lateral radiographs of pelvic limb fractures.

A: A radiograph of the femur and stifle of a dog shows a thinning of the cranial and caudal cortex of femur and tibia with partially healed folding fracture of the distal diaphysis of the femur.

B: A radiograph of the femur and stifle of a dog shows a comminuted fracture in the distal diaphysis of femur with moderate lateral displacement.

C: A radiograph of the femur and stifle of a cat shows spiral complete fracture with sever cranial displacement involving the mid-diaphysis of femur with a small bone fragment and associated with sever soft tissue swelling.

Table 2: Distribution of appendicular fractures of shoulder limb in dogs and cats.

Affection	Cats (n=7)	Dogs (n=10)
Thoracic bone	0 (0%)	2 (20.0 %)
Humerus	5 (71.42%)	1(10.0 %)
Radius and ulna	1 (14.28%)	6 (60.0 %)
Metacarpal	1 (14.28%)	1 (10.0%)

Similarly, in cats, affections in the pelvic limb were significantly higher than shoulder limb ($p<0.01$) (46/53 vs 7/53) as 86.7 % of the affections have occurred in the pelvic limb (Table 1). Femoral bone was the most affected location (19/46) (Figure 2). The frequency of femoral fracture was

significantly higher than tibiofibular bone ($p<0.01$) (19/46 vs 9/46) and metatarsal bone ($p<0.01$) (19/46 vs 1/46) (Table 3).

However, there was no significant variation among other affections of the pelvic limb. In the shoulder limb, there was no significant variation in the frequency of affections in humerus (5/7) radius (1/7) and metacarbal bones (1/7).

Fig. 2: Selected radiographs of shoulder limb fractures.

A: Cranio-caudal radiograph of the radius and ulna of a dog presented with a history of gunshot. There is bone lysis involving the lateral cortex and medulla of the mid-diaphysis of the radius surrounded by a large bone fragment, several small bone fragments and sever soft tissue swelling.

B: Latero-medial radiograph of the radius and ulna of a dog shows complete, transverse and moderately displaced fracture of the mid-diaphysis.

C: Dorso-palmar view of the distal shoulder limb of a dog shows transverse, non-displaced fractures involving the distal diaphysis of the 3rd, 4th and 5th metacarpal bones.

Table 3: Distribution of appendicular fractures of pelvic limb in dogs and cats.

Affection	Cats (n=46)	Dogs (n=28)
Pelvic bone	17 (36.95%)	9 (32.14%)
Femoral bone	19 (41.30%)	7 (25.0%)
Tibia and fibula	9 (19.56%)	11(39.28%)
Metatarsal	1 (2.17%)	1 (3.57%)

Discussion

In the last years, Libyan society has witnessed some changes. One of these changes is the increasing number of cats and dogs kept as pets. This was observed in the number of pet animals admitted to the Veterinary Teaching Hospital of University of Tripoli. Amongst the admitted cases, orthopedic diseases especially appendicular fractures were the most common. The aim of this study was to provide an overview about the classification and prevalence of appendicular affections in dogs and cats in Tripoli. Appendicular fracture was the most prevalent affection among affections in both dogs and cats, 67.8% and 39.5, respectively. This findings may be due to the little

care of owners toward their pets. In addition, the prevalence of appendicular fracture in Tripoli revealed by the present study was higher than that previously reported in both animal species (Senn et al. 2004; Ben Ali 2013).

In this study, the prevalence of appendicular fracture is significantly higher in dogs than in cats (67.8% vs 39.5) (Figure 1). Such variation may be attributed to the owners′ close observation and care directed to cats comparing with dogs, as cats are kept most of time inside houses. Our claim is supported by presence, in this study, of four cases of dogs with appendicular fragmented fracture caused by gun shot. Consistently, Senn et al. (2004) found that road traffic accidents and indoor traumas were the most common causes of fractures in dogs, but falling from heights followed by traffic accident and cat bites were the most common causes in cats. Moreover, cats do have several advantages as orthopedic patients when compared to dogs including their light weight, straight bones, anatomical configuration, and relative lack of genetic developmental disease with the exception of hip dysplasia and patellar luxation. Anatomically, several differences exist between both species (Scott et al., 2007).

In the present study, fracture in the pelvic limbs was higher than shoulder limbs in both dogs and cats (86.7% and 73.6%, respectively). Fractures observed in cats show similarity to fractures observed in dogs as in regard to the site of fracture, however, different types of fracture recorded in cats to those seen in dogs. Similar findings were reported previously (Harasen 2009; Gough A and Thomas A, 2010), with an incidence rate ranged from 73-87% of fracture in the pelvic limb.

In the pelvic limb of dogs, femurotibial bone (11/28) and pelvic bones (9/28) were the most frequent fractures. Similarly, femur (19/46) and pelvic bone (17/46) were the most common fractures in cats. However, in the shoulder limb, radius and ulna in dogs (6/10) and humerus in cats (5/7) were the most common sites of fracture. Similar results have been reported (Senn et al., 2004; Ben Ali 2013). The high prevalence of fracture in these sites has been attributed to the anatomical conformation of the animals (Harasen 2009).

Conclusion

The results of the present study provide a preliminary data about the classification and prevalence of appendicular fractures in dogs and cats in Tripoli - Libya. The prevalence of appendicular fractures are the highest among other affections in dogs and cats. Further epidemiological studies are needed to widen the geographical range and to assess the risk factors associated with such affections.

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