Original Research Article

Clinical Epidemiology of Fractures in Dogs: A Retrospective Study

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A B S T R A C T

The present study was carried out to determine the clinical epidemiology of bone fracture in dogs based on three years data of Veterinary Clinical Complex, College of Veterinary Science & A. H., Junagadh Agricultural University, Junagadh, Gujarat. During study, signalment and clinical details of three years (April, 2017 – March, 2020) cases were analyzed that revealed a total number of 9556 dogs presented for various ailments, in which 2289 (23.95%) cases were of surgical affections. Out of these, 275 (12.01%) cases were of orthopaedic affections. During the study period, higher incidence of fracture was seen in femur followed by tibia-fibula, radius-ulna and humerus. Dogs in the age group of 1-6 months showed highest occurrence in comparison to other age group. Breed wise incidences of fracture was higher in non-descript breed followed by German shepherd, Labrador, Spitz and others while sex wise male was more affected then female. In this study, incidence of right hindlimb fracture was found higher followed by fracture of left hindlimb, right forelimb and left forelimb.

Introduction

Long bones are subjected to physiological and non-physiological forces such as automobile accidents, gunshot injuries and falls. Most common causes of fractures are strong forces like bending, compression, shearing and torsional forces. These forces can be transmitted to bone directly and may exceed the ultimate strength of bone, causing a fracture (Jain *et al.,* 2018). Physiological forces transmitted to the bone through the joint surfaces and muscle contraction when exceed the ultimate strength of bone, responsible for fracture. Dogs constitute the majority of domestic pet population. These pets are prone to appendicular bone fractures, which are frequently caused by traumatic injuries or bone pathology (Jani *et al.,* 2014).

Materials and Methods

To know clinical epidemiology of orthopaedic ailments in dogs, signalment and case details were summarised based on retrospective data of last three years (April-2017 to March-2020) from Veterinary Clinical Complex, College of Veterinary Science & A. H., Junagadh Agricultural University, Junagadh, Gujarat in which signalment was comprised of data regarding age, sex and breed while

clinical details of cases were furnished with details of limb involvement and diagnosis.

Results and Discussion

During last three years (April, 2017 – March, 2020), total 9556 cases of dogs were reported at Veterinary Clinical Complex, College of Veterinary Science & A. H., Junagadh Agricultural University, Junagadh, Gujarat. Out of these, 2289 (23.95%) cases were affected with different types of surgical affections in which 275 (12.01%) orthopaedic affections were recorded. Similarly, Ali (2013) carried out retrospective study of incidence, occurrence, classification and outcome of small animal fractures during the period of five years (2003-2005). During that period of time, 650 cases were presented in small animal surgery unit. Out of which of 116 (dogs and cats) were presented with history of fractures of different bones. A total of 17.8% (116/650) cases were of fractures in which dogs constituted 13.53% (88/650) while cats were 4.30% (28/650).

During last three years, highest incidence was recorded in age group of less than 0.5 year(109 cases, 39.63%), followed by 0.5-1 year (62 cases, 22.54%), 1-2 years (37 cases, 13.45%), 2-3 years (22 cases, 8%), 3-4 years (22 cases, 8%), 4-5 years (08 cases, 2.90%), 6-10 years (14 cases, 5.09%) and 10-12 years (1 case, 0.36%) as shown in table 1. Similarly, Jain *et al.,* (2018) reported highest occurrence of fracture in dogs falling in the age group of 1-6 months (49.71%) followed by 7-12 months (20.11%), 4-5 years (10.65%), 1-2 years (7.69%), 6-7 years (7.10%), 3-4 years (3.55%) and 10-12 years (1.18%). This might be due to the fact that the young ones are more active and not able to cope with hazards unlike their older counterparts. Further, cortices of young dogs are comparatively thinner than the adult, so could not resist even minor trauma resulting in fracture (Aithal *et al.,* 1999).

Incidence of fracture was found higher in males (158/275, 57.45%) as compare to female (117/275, 42.55%) as shown in table 2. Earlier studies by Gahlod *et al.,* (2004) and Kumar *et al.,* (2007) reported higher incidence of long bone fracture in male than the females and tend to wander more than their female counterparts, thus they are more vulnerable to fractures. Further this could also be due to the fact that people like to have male dog more than female dogs, which might be responsible for more population of male dogs (Jani *et al.,* (2014).

Table.1 Age wise distribution of cases showing fractures in dogs

	Age groups (Years)							
	≤ 0.5	0.5-1	1-2	2-3	3-4	4-5	6-10	10-12
No. of cases	109	62	37	22	22	8	14	1
Percentage (%)	39.63%	22.54%	13.45%	8%	8%	2.90%	5.09%	0.36%

Table.2 Sex wise distribution of cases showing fracture in dogs

	Male	Female
No. of cases	158	117
Percentage (%)	57.45	42.55

Table.3 Distribution of cases showing fracture as per limb involvement in dogs

	RH	LH	RF	LF	Mandible	Vertebrae	Skull
No. of cases	87	82	52	33	13	7	1
Percentage (%)	31.63	29.81	18.9	12	4.72	2.74	0.36

Table.4 Distribution of cases showing fracture as per bone involvement in dogs

Sr. No.	Bone	Percentage (%)	Sr. No.	Bone	Percentage (%)
1.	Femur	33.81%	7.	Metacarpus	4%
2.	Tibia	18.18%	8.	Vertebrae	2.54%
3.	Radius	13.81%	9.	Metatarsal	0.72%
4.	Humerus	12.72%	10.	Skull	0.36%
5.	Hip	8.72%	11.	Scapula	0.36%
6.	Mandible	4.72%			

Breed wise, Non-descript breed showed the highest incidence (142/275, 51.63%) followed by German shepherd (54/275, 20%), Labrador retriever (29/275, 10.54%), Pomeranian/Spitz (17/275, 6.18%), Doberman (16/275, 5.81%), Great Dane (5/275, 1.81%), Saint Bernad (5/275, 1.81%), Rottweiler (4/275, 1.45%), Golden retriever (1/275, 0.36%), Beagle (1/275, 0.36%) and Lhasa Apso (1/275, 0.36%). Similar results were observed by Jain *et al.,* (2018) and Sran *et al.,* (2016)who reported highest occurrence of fracture in non-descript dogs (27.81%) followed by Labrador (21.89%), German shepherd (21.30%), Pomeranian/Spitz (20.11%), Doberman (3.55%), Great Dane (2.36%), St. Bernard (0.59%), Rottweiler (0.59%), Mastiff (0.59%) and Dalmatian (0.59%). In the present study, higher incidence in non-descript dogs might be due to higher population and free living nature of these dogs making them more prone to automobile accidents (Borges *et al.,* 2016).

In present study, clinical details of cases were also analyzed that revealed higher occurrence of right hindlimb fracture (87/275, 31.63%) followed by left hindlimb fracture (82/275, 29.81%), right forelimb fracture (52/275, 18.90%), left forelimb fracture (33/275, 12%),

mandible (13/275, 4.72%), vertebrae (7/275, 2.74) and skull (1/275, 0.36%) as shown in table 3. Moreover, right limb fracture (139/275, 50.54%) was more recorded than the left limb fracture (115/275, 41.81%). Similar results were observed by Jain *et al.,* (2018) in which right hindlimb fracture (50.00%) was more observed followed by left hindlimb (38.88%), left forelimb (5.55%) and right forelimb (5.55%).

On the basis of bone involvement, occurrence of fracture was found higher in femur (93/275, 33.81%) followed by fracture of tibia-fibula (50/275, 18.18%), radius-ulna (38/275, 13.81%), humerus (35/275, 12.72%), hip (24/275, 8.72%), mandible (13/275, 4.72%), metacarpus (11/275, 4%), vertebrae (7/275, 2.54%), metatarsal (2/275, 0.72%), skull (1/275, 0.36%) and scapula (1/275, 0.36%) as shown in table 4. Earlier study by Abd El Raouf *et al.,* (2019) reported higher incidence of femur fracture (27.13%) followed by tibia-fibula (15.5%), radius-ulna (11.63%) and humerus (10.08%). The percentage of metacarpus or digit fractures was 6.98% while of metatarsus or digit was 5.43%. This observation indicates that the presence of abundant muscle do not protect the femur from getting fractured (Markel *et*

al., 1994). In automobile accidents, animals are likely to be hit from behind, as the animals were slow to react from their hind quarters, might be the cause of more fracture in hindlimb (Harasan, 2003).

In conclusions the clinical epidemiology of fracture in dogs revealed higher incidence in males as compared to females; Age wise young animals are more prone and Non-descript breed is commonly affected. While clinical details show higher incidences of femur fracture and unilateral right side limb involvement in dogs.

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