

Original Research Article

<https://doi.org/10.20546/ijcmas.2017.607.184>

Review on Fracture, Dislocation and Neurological Affections in Animals between April 2011 to March 2013 around the Urban and Suburban Area of Guwahati, India

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ABSTRACT

Keywords

Fracture, Dislocation, Neurological affections, Animals, Urban and Suburban area, Incidence.

Article Info

Accepted:
19 June 2017
Available Online:
10 July 2017

Fracture, dislocation and neurological affections are common in animals and can be fatal to life if proper treatment is not rendered. The present study reports the incidence of two years on fracture, dislocation and neurological affections in different species of animal from the urban and suburban area of Guwahati. Total of 232 cases related to fracture 88.79% (n=206), dislocation 6.03% (n=14) and neurological 5.17% (n=12) affections in different species were recorded in two years. The incidence of fracture was highest in canine (dog) 67.96% (n=140) followed by caprine (goat) 18.44% (n=38), feline (cat) 6.31% (n=13), avian (vulture) 3.40% (n=7), laprine (rabbit) 1.94% (n=4), bovine (cattle) 1.46% (n=3) and ape (*Rhesus macaque*) 0.49% (n=1). Dislocation was highest in canine 71.42% (n=10) followed by feline 14.28% (n=2), caprine 7.14% (n=1) and avian 7.14% (n=1). Neurological affection was reported in canine. Higher incidence of femur fracture occurred in dog and cat, metatarsal in goat and cattle; tibia in rabbit; fibula in vulture and radius in ape. Higher incidence of oblique fracture was in dog, cat, goat, and rabbit however transverse fracture in vulture and *Rhesus macaque*. Accident (vehicular/ train) accounted the major cause for fracture (dog, cat, vulture) and dislocation (goat, cat, vulture).

Introduction

Availability of information or data regarding various affections forms a powerful tool in terms of rendering appropriate treatment, saving times and economy, are beneficial for making better future policy and also reduces the loss of life and economy in near future. At present era it is challenging for the policy maker to come up with the policy in which animal and human requirement are kept equilibrium. In veterinary practices, the incidence of fracture has increased manifold (Aithal *et al.*, 1999). The cause of increase in

incidence is attributed to the increase in the number of automobile vehicles leading to motor vehicular accident, change in the life style of human as well as animal. Similar is the situation for dislocation and neurological affection where change in the life style of the humans has predisposed the animals towards these affections. Dogs due to their active nature often suffer from lameness (Mohsina *et al.*, 2014). Lameness in dog is mainly due to musculoskeletal disorder though neurological cause cannot be ruled out (Scott and Witte,

2011). Treatment of fracture, dislocation and neurological affections becomes challenging or irreparable when the conditions become chronic in nature. With the change of time, advancement in the treatment of fracture from intramedullary pin (Hulse and Aron, 1994) to interlocking nail (Muir and Johanson, 1996) to minimal invasive technique of plating and interlocking nail has evolved. The improvement in treatment of dislocation and neurological affections has also evolved in the recent period of time with the advancement of diagnostic modality in veterinary field. Data regarding incidence of fracture, dislocations and neurological affection from the corridor of North Eastern State of India are not available till date. Therefore the present study was designed to acquire data on fracture, dislocation and neurological affections from the urban and suburban area of Guwahati, Assam, India. This study will act as a base for the policy maker of the Northeastern part of India for implementation of future project in the field of orthopaedics and neurological affections in different species of animals.

Materials and Methods

All the registered fracture, dislocation and neurological affections cases in the Department of Veterinary Surgery and Radiology and Teaching Veterinary Clinical Complex, College of Veterinary Science, Khanapara, Assam Agricultural University for a period of two year from 1st April 2011 to 31st March 2013 were taken into study. Diagnosis was based on the clinical history, clinical sign, clinical examination, neurological examination, confirmation by radiograph and contrast radiography by using Iohexol. Treatment as medicinal or surgical interventions was provided wherever feasible. The data in respect of species, breed, sex, age, bone/ joint wise, loss of skin integrity, type of fracture, type of dislocation and cause were compiled and analysed.

Results and Discussion

A total number of 232 cases were recorded, related to fracture (n=206), dislocation (n=14) and neurological (n=12) affections in different species in two years (Fig. 1). Fracture accounted highest 88.79% (n=206) followed by dislocation 6.03% (n=14) and neurological affection 5.17% (n=12) (Fig. 2). The incidence of fracture was highest in canine (dog) 67.96% (n=140) followed by caprine (goat) 18.44% (n=38), feline (cat) 6.31% (n=13), avian (vulture) 3.40% (n=7), laprine (rabbit) 1.94% (n=4), bovine (cattle) 1.46% (n=3) and ape (*Rhesus macaque*) 0.49% (n=1) (Fig. 2). The higher incidence of fracture in canine (dog) can be attributed to the species preference by the urban and suburban population of Guwahati as their companion pet. However it also depicts the sensitivity of the pet owners for availing medical treatment for their pets. The maximum incidence in canine (dog) might also be due to the higher number of motor vehicular accidents in this species of animal in comparison to the other species as they are let loose or due to their wandering habit which makes them more prone to accidents. The findings correlates with that of Tambe *et al.*, (2012) where the authors observed highest incidence of fracture in dogs (26.50%) followed by cattle (25.20%), camels (15%), buffaloes (12.50%), horses (8%), goats (5.50%), birds (4.50%), rabbits (1.50%) and monkeys (1%).

Dislocation was observed in 14 cases in different species (Fig. 3). In canine highest number of cases 71.43% (n=10) followed by feline 14.29% (n=2), caprine 7.14% (n=1) and avian 7.14% (n=1) (Fig. 3). Mohsina *et al.*, (2014) in their study on incidence of lameness in different species observed hip dislocation (6%) as a cause of lameness in dogs. Neurological affection was observed only in canine (n=12) (Table 2). Mohsina *et al.*, (2014) has opined that dogs often suffer from lameness due to their active nature. Scott and

Witte (2011) have stated that lameness in dog occur more commonly due to musculoskeletal disorder than neurological.

The populations of swine (pig) are more in the suburban area of Guwahati however no cases on orthopaedic/dislocation/neurological affections were reported in swine (pig). This might be because of fewer occurrences of orthopaedic/dislocation/neurological affections in swine or might be because of the economic factor as the farmers prefer to slaughter their animal than taking the economic burden of treatment.

Fractures accounted for 67.96 % (n=140) cases in canine (dogs). The breed wise distribution of incidence of fracture revealed highest in Mongrel 52.14% (n=73) followed by Labrador 16.43% (n=23), Spitz 10.71% (n=15), Dalmatian 5.71% (n=8), German shepherd 3.57% (n=5), Lhasa Apso 1.43% (n=2), Dobberman 2.14% (n=3), Rottweiler (2.14 %) (n=3), French Mastiff 1.43% (n=2), Pug 1.43% (n=2), Daschund 1.43% (n=2) and St. Bernard 1.43% (n=2) (Fig. 4). The highest incidences of fracture in Mongrel dogs might be due to their higher population size, being let loose and their wandering nature. The findings correlate to that of Aithal *et al.*, (1999), Simon *et al.*, (2010), Singh *et al.*, (2011), Rani *et al.*, (2007) however contrary to Balagopalan *et al.*, (1995) where the highest incidence was observed in Alsatian breed.

The incidence of fracture was higher in male dog 66.43 % (n= 93) than the female 33.57 % (n=47) (Table 1). The higher incidence in male in the present study might be due to the higher population of male or male are preferred more as companion pet than the female in the area of study. This might also be attributed to the fact that the males are more aggressive and tend to wander more than female counterpart thus more vulnerable to road traffic accident, fall/jump (Kolata *et al.*,

1974). The findings in the present study correlate with that of Balagopalan *et al.*, (1995), Aithal *et al.*, (1999), Rani *et al.*, (2007), and Simon *et al.*, (2010).

Dog less than one year of age 54.29% (n= 76) were affected more with fracture than above one year 45.71 % (n= 64) of age (Table 1). This might be due to the fact that the young animals are more active and have not learnt to cope with the hazard unlike their older counterparts (Kolata *et al.*, 1974) and might become nervous or excited on seeing motor vehicles therefore become more prone to accident.

Bone wise incidence of 140 fracture cases revealed, femur being mostly affected 35.71% (n=50), followed by radius 20% (n= 28), tibia 16.43% (n=23), humerus 8.57 % (n= 12), metacarpal 5 % (n= 7), lumbar 4.29 % (n= 6), mandible 3.57 % (n= 5), phalanges 3.57% (n=5), metatarsal 2.86% (n=4) (Table 1 and Fig. 5). The higher incidence of femur fracture might be due to the increased forces and momentum placed on proximal bones caused by physical factors such as muscle forces used for locomotion and resistance to the forces of gravity, ground reaction forces as limbs strike the ground and a long moment arm at the proximal aspect of limb compared with the distal portion of the limb (Markel *et al.*, 1994). The findings agree with the previous studies (Simon *et al.*, 2010; Aithal *et al.*, 1999; Balagopalan *et al.*, 1995; Patil *et al.*, 1991). Closed fracture were recorded higher 58.57% (n=82) as compared to open fracture 41.43% (n=58) (Table 1). Higher incidence of closed fracture can be attributed to the fact that fracture incurred in higher percentage in the bone which were under the thick belly of muscle preventing them to lose its integrity through skin. The oblique fracture accounted highest 37.14% (n=52) followed by transverse 32.86% (n=46), spiral 13.57% (n=19), comminuted 5.71% (n= 8), multiple 10.71% (n=15) respectively (Table 1). The

higher incidence of oblique fracture may be attributed to the predominance of bending or compression force (Newton and Nunamaker, 1985) acting to break a dog's bone. The findings correlate with that of Aithal *et al.*, (1999). Road traffic accident accounted for 61.43% (n= 86) and due to fall or jump 38.57% (n= 54) cases. The major causes of fracture in dogs were due to road traffic accident and correlates with the previous study by Mala and cello, (1975), Philips (1979), Aithal *et al.*, (1999).

Dislocation was observed in 10 cases in canine (dog) (Table 2). Among the dislocation Coxo-femoral dislocation were observed in 70% (n=7), Lumbar dislocation 20% (n=2) and Scapulo-humeral 10% (n=1) (Table 2). In Coxo-femoral dislocation (n=7), cranio-dorsal coxo-femoral dislocation were observed in 71.43% (n= 5) and caudo-dorsal in 28.57% (n=2) (Table 2). Coxo-femoral dislocation (cranio-dorsal dislocation) occurrence was higher than other dislocation and correlates with Newton and Nunamaker (1985). In lumbar dislocation (n=2), L3-L4 was observed in 50% (n=1) and L4-L5 in 50% (n= 1) (Table 2). In Scapulo-humeral (n=1), medial scapulo-humeral dislocation was recorded in 100 % (n= 1) (Table 2). Among the breed dislocation was accounted highest in Labrador 50% (n=5) (coxo-femoral) followed by German shepherd 20% (n=2) (coxo-femoral), mongrel 20% (n=2) (L3-L4, L4-L5) and pug 10% (n=1) (Scapulo-humeral). The higher incidence in labrador breed might be due to the breed favoritism as companion pet or higher population of this breed in the area of study. Male dogs were affected more 70% (n=7) in comparison to the females 30% (n=3) (Table 2). This might be because of the favoritism of male dogs as companion pet or due to their wandering habit which make them more vulnerable to accidents/fall/hit in the area of study. Higher incidence of dislocation was observed in dogs less than one year of age 60% (n=6) than

above one years of age 40% (n=4) (Table 2). This might be because as the joints of these dogs are in growing stage therefore trauma of any form may predispose them to dislocation. In the dogs with dislocation the most common cause was fall from height 50% (n=5) followed by slipping on the marble floor 30 % (n=3) and vehicular accident by the owner 20% (n=2).

Neurological affection was reported in 12 cases (Fig. 1). Neurological affections were observed in Daschund 25% (n=3), Dobberman 25% (n=3), German shepherd 25% (n=3), Spitz 16.67% (n=2) and Labrador 8.33% (n=1). Neurological affection accounted higher incidence in female 66.67% (n=8) than male 33.33% (n=4). The neurological affections accounted higher in animal above 1 year of age 75% (n=9) followed by below one year of age 25% (n=3) (Table 2). The findings indicate that with the advancement of age the chance of neurological affections increases. Epilepsy was noted in 25% (n=3) cases followed by Vestibular syndrome 25% (n=3), Intervertebral disk disease 16.66% (n=2), Wobbler syndrome 16.66% (n=2), facial nerve paralysis 16.66% (n=2) (Table 2).

In Caprine (Goat) 38 cases of fracture were recorded (Fig. 2). Out of 38 recorded cases, 84.21% (n=32) cases were recorded in Assam hill goat followed by Black Bengal 13.16% (n=5), beetal 2.63 % (n=1) breed of goats (Fig. 2). The higher incidence in Assam hill goat might be because of the breed preference or readily availability and or disease resistant trait of this breed in the area of study. Fracture accounted highest in female 76.32% (n=29) followed by male 23.68% (n=9) (Table 1). This can be attributed to the fact that female goats are preferred by farmers due to their economic contribution, and the farmers are willing to take the burden of medical treatment in female goat.

Table.1 Incidence of fracture, type of fracture, loss of integrity to the skin, Bone involved, sex and age in different species

TYPE OF FRACTURE	Canine (Dog)	Caprine (Goat)	Feline (Cat)	Avian (Vulture)	Laprine (Rabbit)	Bovine (Cattle)	Ape (Monkey)
Oblique	37.14% (n=52)	31.58% (n=12)	61.54% (n=8)	14.29% (n=1)	50% (n=2)	0 0	0 0
Transverse	32.86% (n=46)	26.31% (n=10)	23.08% (n=3)	28.57% (n=2)	25% (n=1)	33.33% (n=1)	100% (n=1)
Spiral	13.57% (n=19)	15.80% (n=6)	15.38% (n=2)	28.57% (n=2)	25% (n=1)	0 0	0 0
Comminuted	5.71% (n=8)	0 0	0 0	0 0	0 0	0 0	0 0
Multiple	10.71% (n=15)	26.30% (n=10)	0 0	28.57% (n=2)	0 0	66.67% (n=2)	0 0
LOSS OF INTEGRITY TO THE SKIN							
Compound/Open fracture	41.43% (n=58)	57.89% (n=22)	46.15% (n=6)	71.43% (n=5)	50% (n=2)	100% (n=3)	0 0
Closed fracture	58.57% (n=82)	42.11% (n=16)	53.85% (n=7)	28.57% (n=2)	50% (n=2)	0 0	100% (n=1)
BONE WISE FRACTURE							
Femur	35.71% (n=50)	2.63% (n=1)	46.15% (n=6)	14.29% (n=1)	25% (n=1)	0 0	0 0
Radius	20% (n=28)	10.52% (n=4)	0 0	28.57% (n=2) (Ulna)	25% (n=1)	0 0	100% (n=1)
Tibia	16.43% (n=23)	18.42% (n=7)	30.77% (n=4)	42.85% (n=3) (Fibula)	50% (n=2)	0 0	0 0
Humerus	8.57% (n=12)	5.26% (n=2)	0 0	14.29% (n=1)	0 0	0 0	0 0
Metacarpal	5% (n=7)	23.68% (n=9)	0 0	0 0	0 0	33.33% (n=1)	0 0
Lumbar	4.29% (n=6)	0 0	0 0	0 0	0 0	0 0	0 0
Mandible	3.57% (n=5)	0 0	23.08% (n=3)	0 0	0 0	0 0	0 0
Phalanges	3.57% (n=5)	0 0	0 0	0 0	0 0	0 0	0 0
Metatarsal	2.86% (n=4)	39.47% (n=15)	0 0	0 0	0 0	66.67% (n=2)	0 0
SEX							
Male	66.43% (n=93)	23.68% (n=9)	61.54% (n=8)	Could not be determined	25% (n=1)	0 0	100% (n=1)
Female.	33.57% (n=47)	76.32% (n=29)	38.46% (n=5)		75% (n=3)	100% (n=3)	0 0
AGE							
Less than 1 year	54.29% (n=76)	36.84% (n=14)	61.54% (n=8)	Could not be determined	100% (n=4)	66.66% (n=2)	0 0
Above 1 year	45.71% (n=64)	63.16% (n=24)	38.46% (n=5)		0 0	33.33% (n=1)	100% (n=1)

Table.2 Incidence of dislocation, type of dislocation, Neurological affections, sex and age in different species

DISLOCATION	Canine (Dog)	Caprine (Goat)	Feline (Cat)	Avian (Vulture)	Laprine (Rabbit)	Bovine (Cattle)	Ape (Monkey)			
TYPE OF DISLOCATION										
Coxo-femoral	70% (n=7)	100% (n=1)	100% (n=2)	0 0	Case was not presented					
Coxo-femoral Craniodorsal	71.43% (n=5)	100% (n=1)	100% (n=2)	0 0						
Coxo-femoral Caudo-dorsal	28.57% (n=1)	0 0	0 0	0 0						
Scapulo-Humeral	10% (n=1)	0 0	0 0	100% (n=1)						
Medial	100% (n=1)	0 0	0 0	100 (n=1)						
Lumbar dislocation	20% (n=2)	0 0	0 0	0 0						
L3-L4	50% (n=1)	0 0	0 0	0 0						
L4-L5	50% (n=1)	0 0	0 0	0 0						
SEX										
Male	70% (n=7)	0 0	100% (n=2)	Could not be determined				Case was not presented		
Female	30% (n=3)	100% (n=1)	0 0							
AGE										
Less than 1 year	60% (n=6)	0 0	50% (n=1)	Could not be determined	Case was not presented					
Above 1 year	40% (n=4)	100% (n=1)	50% (n=1)							
NEUROLOGICAL AFFECTIONS										
Epilepsy	25% (n=3)	Case was not presented								
Vestibular syndrome	25% (n=3)									
Intervertebral disk disease	16.66% (n=2)									
Wobbler syndrome	16.66% (n=2)									
Facial nerve paralysis	16.66% (n=2)									
SEX										
Male	33.33% (n=4)	Case was not presented								
Female	66.67% (n=8)									
Age										
Less than 1 year	25% (n=3)	Case was not presented								
Above 1 year	75% (n=9)									

Fig.1 Incidence of fracture, dislocation and neurological affections

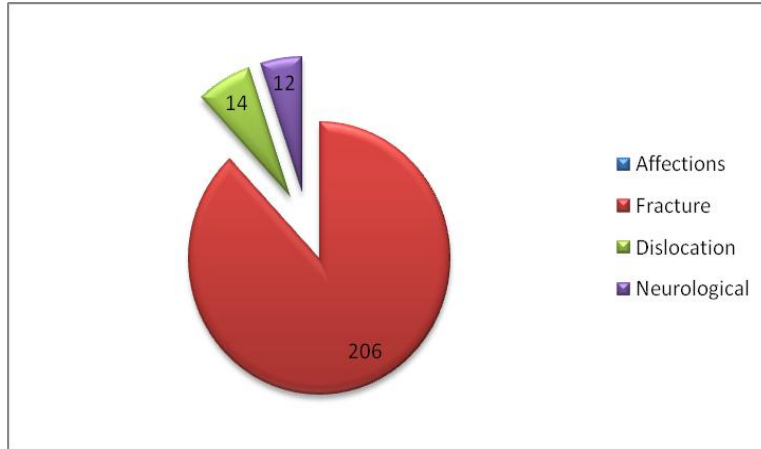


Fig.2 Incidence of fracture in different species of animals

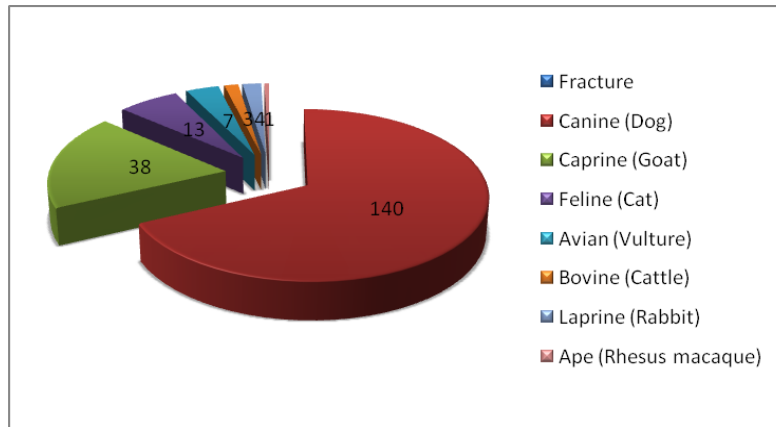


Fig.3 Incidence of dislocation in different species of animals

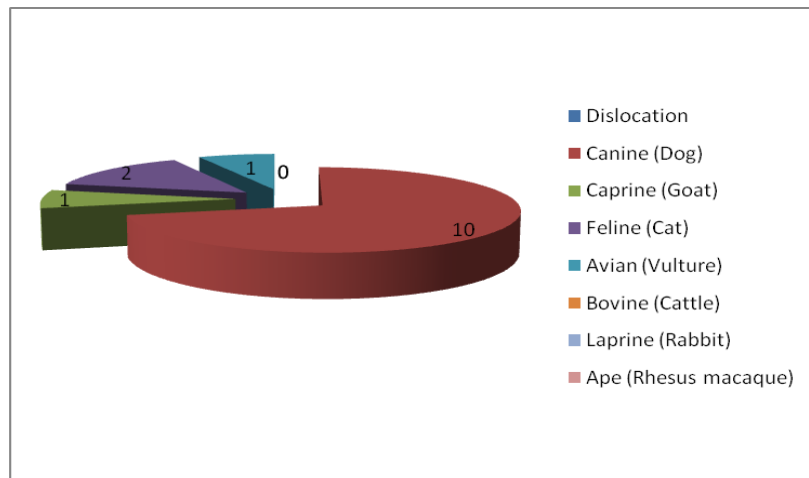


Fig.4 Breeds wise distribution of fracture incidence in dogs

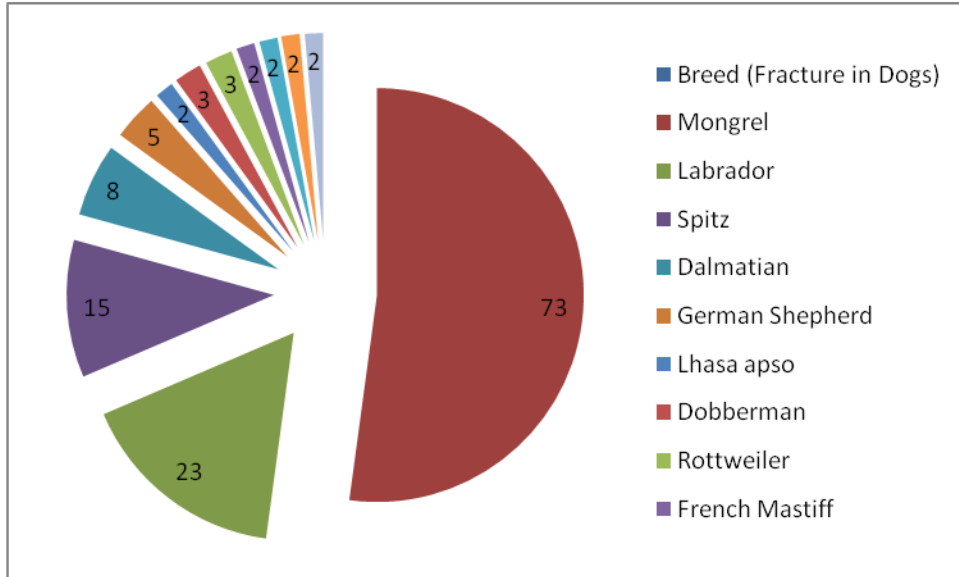
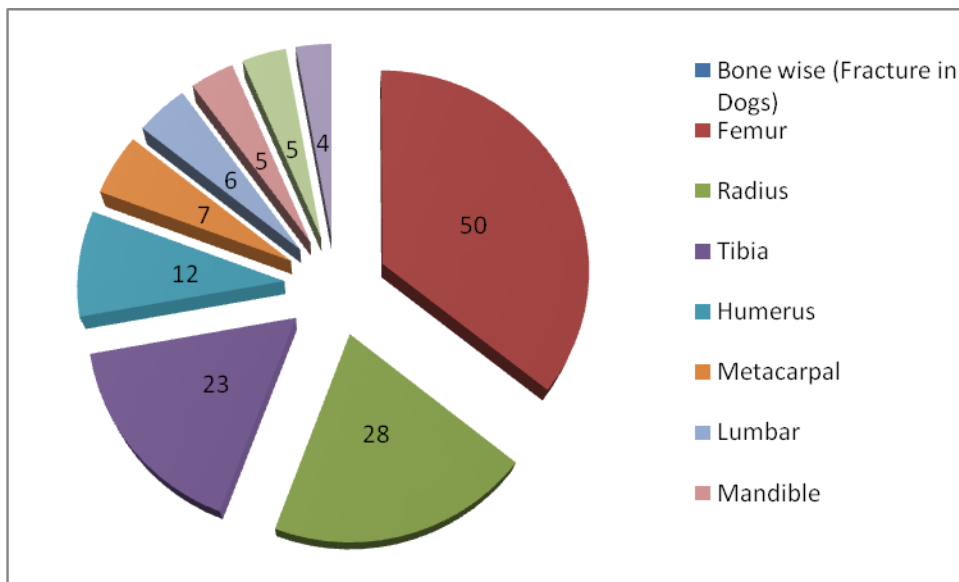


Fig.5 Incidence of bone involved in fracture of dogs



Fracture accounted higher in goat above one year of age 63.16% (n=24) as compared to below one year of age 36.84% (n=14) (Table 1). The higher incidence in these animals might be because they are more active in search of feed i.e. leaves and twigs, for grazing in hills or meet accident while crossing the road or while being chase by

dogs. Among the bone, fracture incurred highest in metatarsal 39.47% (n=15) followed by metacarpal 23.68% (n=9), tibia 18.42% (n=7), radius 10.52% (n=4), humerus 5.26% (n=2), femur 2.63% (n=1) (Table 1). Compound fracture accounted in 57.89% (n=22) and closed fracture 42.11% (n=16) (Table 1). The higher incidence of fracture in

metatarsal bone and compound fracture might be because, the fracture occurred in bone having lower percentage of soft tissue covering for protection. Therefore making the bone vulnerable to lose its integrity and come out through the skin. Oblique fracture accounted in 31.58% (n=12), transverse fracture 26.31% (n=10), multiple 26.31% (n=10) and spiral fracture 15.80% (n=6) (Table 1). The higher incidence of oblique fracture may be attributed to the predominance of bending or compression force (Newton and Nunamaker, 1985) acting on the bone of goat. Vehicular accident accounted in 86.84% (n= 33) cases of fracture, limb entangled in barbed wire 7.89% (n=3), leg trapped in a pit hole 5.26% (n=2). Higher incidence can be attributed to the increase in the number of motor vehicular accidents while in search of feed or while being chase by dogs in and around the suburban area.

Dislocation was noted in 1 case in goat (Table 2, Fig. 3). It occurred in Assam hill goat (n=1), it might be due to breed preference or breed availability in urban and suburban area. Dislocation was observed in female 100% (n=1), it can be attributed to the fact that female are more preferred due to economic contribution. It occurred in goat above 1 year of age. It might be due to the active nature of the animal in this group, while being in search of feed. Coxo-femoral dislocation (cranio-dorsal) was observed.

The higher incidence of coxo-femoral dislocation (cranio-dorsal) has been observed in other species i.e. canine (dog) (Newton and Nunamaker, 1985). Dislocation 100% (n=1) was caused due to vehicular accident. This indicates, as these animals are in search of leaves and twigs for food make them more vulnerable to road traffic accidents and or fall from hilly slopes while being chase by the dog. Neurological affection was not reported.

In Feline (cat) 13 cases of fracture were recorded (Fig. 2). Fracture cases were recorded in Indian breed of cats 100% (n=13), might be due to breed availability. Male accounted for highest incidence of fracture 61.54% (n=8) and female 38.46% (n=5) (Table 1). It can be attributed to the fact that the male are more adventurous and loitering in nature therefore more prone to accidents. Fracture incidence were higher in cats less than one year of age 61.54% (n=8) followed by above one year of age 38.46% (n=5) (Table 1). This might be due to the fact that the young animals are more active and have not learnt to cope with the hazard unlike their older counterparts (Kolata *et al.*, 1974) and might become nervous or excited on seeing motor vehicles therefore become more prone to accident.

Femur was most commonly affected 46.15% (n=6) followed by tibia 30.77% (n=4), mandible 23.08% (n=3) (Table 1). The higher incidence of fracture in femur might be due to increased forces and momentum placed on proximal bones caused by physical factors such as muscle forces used for locomotion and resistance to the forces of gravity, ground reaction forces as limbs strike the ground and a long moment arm at the proximal aspect of limb compared with the distal portion of the limb (Markel *et al.*, 1994) probably make them more susceptible to fracture. The findings correlate with previous study by Phillips (1979), Harasen, 2003, Elzomor *et al.*, (2014). Closed fracture were seen in 53.85% (n=7) and compound fracture accounted for 46.15% (n=6) (Table 1). It might be due to the fact that fracture incurred in higher percentage in the bone which was under the thick belly of muscle preventing them to lose their integrity through skin. Oblique fracture accounted in 61.54% (n=8), transverse 23.08% (n=3) and spiral 15.38% (n=2) (Table 1). The highest incidence of oblique fracture may be attributed to the predominance of

bending or compression (Newton and Nunamaker, 1985) force acting to break cat bone. For fracture incidence vehicular accident accounted for 84.62% (n=11), hit by owner with wooden stick 15.38% (n=2). Vehicular accident has also been observed as the major cause of fracture in dogs and has been reported in previous study by Mala and cello, (1975), Philips (1979), Aithal *et al.*, (1999).

Coxo-femoral dislocation (cranio-dorsal) was reported in 2 cases (Fig. 2). Coxo-femoral dislocation was recorded in Siamese cat 50% (n=1) and Indian native breed of cat 50% (n=1) (Table 2). Coxo-femoral dislocation was recorded in male cats 100% (n=2) (Table 2). Coxo-femoral dislocations was recorded in cats less than one year 50% (n=1) and above one year of age 50% (n=1) (Table 2). Vehicular accident was the main cause of dislocation 100% (n=2). Neurological affections were not reported in cat.

In Avian fracture were recorded in 7 cases (Fig. 2). The recorded cases were in vultures (n=7). Fracture were recorded in Himalayan griffon 57.14% (n=4) followed by White back 28.57% (n=2) and Slender bill 14.29% (n=1). Sex and age could not be determined. Bone wise distribution of fracture revealed highest incidence in fibula 42.85% (n=3) followed by ulna 28.57% (n=2), humerus 14.29% (n=1) and femur 14.29% (n=1) (Table 1). Compound fracture were observed in 71.43% (n=5) and closed fracture in 28.57% (n=2) (Table 1). Transverse fracture accounted 28.57% (n=2), multiple 28.57% (n=2), spiral 28.57% (n=2) and oblique in 14.29% (n=1) (Table 1). The incidence of fracture in vultures was due to accident by train.

Dislocation was recorded in 1 case. Dislocation was recorded in vulture 100% (n=1). It incurred in Himalayan griffon 100% (n=1). Sex and age could not be determined.

Scapulo-humeral (medial) dislocation was recorded in vulture 100% (n=1) (Table 2). The cause of dislocation was accident by train. Neurological affection was not observed in vultures. In Laprine fracture accounted in 4 cases (Fig. 2). The recorded cases of fracture were in New Zealand white 100% (n=4). Incidence of fracture were higher in female 75.00% (n=3) followed by male 25% (n=1) (Table 1). All the recorded cases (n=4) of fracture in Laprine were in less than one year of age (Table 1). Compound fracture accounted in 50% (n=2) and closed fracture 50% (n=2) (Table 1). Oblique fracture were seen in 50% (n=2) followed by spiral 25% (n=1) and transverse 25% (n=1) (Table 1). Tibia appeared to be mostly affected 50% (n=2) followed by radius 25% (n=1) and femur 25% (n=1) (Table 1). The cause of fracture in these animal were entangled leg in cage 50% (n=2), chase and caught by dog 25% (n=1) and entrapment of limb in between the door 25% (n=1). Dislocation and neurological affections was not reported in laprine.

In bovine fracture was recorded in 3 cases (n=3) (Fig. 2). Among the breed Holstein Friesian cross breed cattle accounted 33.33% (n=1), Jersey cross breed 33.33% (n=1) and Assam indigenous cattle 33.33% (n=1). Female accounted for all the fracture cases 100% (n=3) (Table 1). The higher incidence of fracture was observed in cattle less than 1 year of age 66.66% (n=2) followed by above 1 year 33.33% (n=1) (Table 1). Metatarsal fracture incidence were higher 66.67% (n=2) followed by metacarpal 33.33% (n=1) (Table 1). Compound fracture were seen in all the cases 100% (n=3) (Table 1). Multiple fracture were seen in 66.67% (n=2) followed by transverse fracture in 33.33% (n=1) (Table 1). Cause of fracture included slipped and fell down 33.33% (n=1), vehicular accident 33.33% (n=1) and entrapment of the leg in draining pit 33.33% (n=1). Dislocation and

neurological affection was not reported in bovine.

In Ape fracture was recorded in 1 case (n=1) 100% (Fig. 2). *Rhesus macaque* was affected with fracture. Fracture was recorded in male (n=1) (Table 1). The animal was above 1 year of age (Table 1). Closed fracture was observed (n=1) (Table 1). Radius was fracture (n=1) (Table 1). Transverse fracture was observed (n=1) (Table 1). Cause of fracture was inn fighting. Dislocation and neurological affection was not reported in ape.

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How to cite this article:

Chandan Kumar Singh, Kushal Konwar Sarma, Dwijen Kalita, Bitupona Deuri and Parsha Jyoti Nath. 2017. Review on Fracture, Dislocation and Neurological Affections in Animals between April 2011 to March 2013 around the Urban and Suburban Area of Guwahati, India. *Int.J.Curr.Microbiol.App.Sci.* 6(7): 1540-1550. doi: <https://doi.org/10.20546/ijcmas.2017.607.184>