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Occurrence Pattern of Different Types of Fracture in Bovine, Caprine and Canine

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ABSTRACT

A total number of 12004 cases of different species were registered in Teaching Veterinary Clinical Complex, Jabalpur, during study period. Out of these 12004 cases, 153 animals were presented with the fracture in any of the limb. The incidence of fracture was found to be 1.27%. Canine was the most common (58.82%) species to have a fracture. The incidence of fracture was highest (60.00%) in animals of age below 9 months. Further, the male animals (53.34%) outnumbered female (46.66%) for fracture cases. The tibia-fibula (36.66%) was the most common bone affected with fracture followed by metatarsal (23.33%) and radius–ulna (16.66%). Most of the fractures were oblique and transverse types and were located in midshaft of a bone. Hind limb was found more vulnerable for a fracture than fore limb. Fractures were more commonly recorded in left limbs (66.66%) of animal than the right limbs (33.34%). Automobile accident (50.00%) was found to be most common cause of a fracture.

Keywords: Fracture, goats, canine, bovine

The goat is one of the small domesticated ruminants which have served mankind earlier and longer than cattle and sheep. Fracture of long bones is one of the major common orthopaedic conditions encountered in goats and other small ruminants. In Hissar, most fractures occurred in goats between 1 to 3 years of age and were observed in femur, tibia, metacarpus or metatarsus, phalanx, humerus, radius and ulna in decreasing order of frequency (Singh *et al*., 1983 and Awatif *et al.,* 2006).

MATERIALS AND METHODS

Animals

The study was conducted on eight goats aged between 9 months to 5 years having long bone fracture, brought to Teaching Veterinary Clinical Complex, Jabalpur during study period. History was taken to record cause of fracture and duration passed after fracture happened. Other remarkable information was also recorded.

Radiographic examination

Radiographic examination in two orthogonal views of the affected limb was conducted using a 100 mA Multi-Mobil (Siemens) machine with standard exposure factors. The radiograph was prepared on a conventional radiographic film or on Computerised Radiography (CR) System.

RESULTS AND DISCUSSION

Incidence

Incidence of fracture was calculated from the total cases registered at Teaching Veterinary Clinical Complex, College of Veterinary Science and Animal Husbandry, Jabalpur. During the study period (July, 2016 to March, 2017), a total number of 12004 cases were registered and among these, 153 cases were recorded of fracture in different species of animals, which accounted for an incidence of 1.27 % (Table 1).

Table 1: Incidence of fracture in different species of animals presented at TVCC

Species	Total no. of animals registered	No. of animals having a fracture	Per cent	Chi-square test
Canine	9363	90	0.96	104.73**
Caprine	2115	30	1.41	
Bovine	297	18	6.06	
Others	229	15	6.55	
Total	**12004**	**153**	**1.27**	

Species

Among 153 cases of fractures, the highest number of fracture was recorded in canine (58.82%) followed by caprine (19.61%), bovine (11.76%) and others (9.81%) (Table 2).

Table 2: Species-wise distribution of fracture in goats

Species	Number	Per cent
Canine	90	58.82
Caprine	30	19.61
Bovine	18	11.76
Others	15	9.81
Total	**153**	**100.00**

Age

Among 30 cases of fracture in goats, the highest percentage of fracture was recorded in animals of age below 9 months (60.00%), followed by age group of 3 - 5 years (23.33%) and age group of 9 months - 3 years (16.66%) (Table 3).

Table 3: Age-wise distribution of fracture in goats

Age of animals	Number	Per cent
Below 9 months	18	60.00
9 months – 3 years	5	16.66
3 – 5 years	7	23.33
Total	**30**	**100.00**

Sex

The fracture was found to be more common in male animals (53.34%) than female (46.66%) animals (Table 4).

Table 4: Sex-wise distribution of fracture in goats

Sex	Number	Per cent
Male	16	53.34
Female	14	46.66
Total	**30**	**100.00**

Involvement of different bones

Among different bones, highest number of fracture was recorded in tibia-fibula (36.66%) followed by metatarsal (23.33%), radius-ulna (16.66%), humerus (10.00%), metacarpal (6.66%) and femur (6.66%) (Table 5).

Table 5: Distribution of fracture in different bones

Bone involved	Number	Per cent
Humerus	03	10.00
Radius – ulna	05	16.66
Metacarpal	02	6.66
Femur	02	6.66
Tibia-fibula	11	36.66
Metatarsal	7	23.33
Total	**30**	**100.00**

Types of fracture

Types of fracture observed during the study period were oblique (46.67%), transverse (46.67%) and spiral (6.66%) (Table 6).

Table 6: Types of fracture in different bones

Types of fracture	Number	Per cent
Oblique	14	46.67
Transverse	14	46.67
Spiral	02	6.66
Total	**30**	**100.00**

Location of fracture

On the basis of location, highest number of fracture was observed in diaphysis (56.66%) followed by distal third (33.34%) and proximal third (10.00%) (Table 7).

Table 7: Location of fracture in different long bones

Location of fracture	Number	Per cent
Proximal third	3	10.00
Diaphysis	17	56.66
Distal third	10	33.34
Total	**30**	**100.00**

Fracture in different limbs

Among 30 cases of goats, more number of fracture was recorded in hind limbs (63.34%) than fore limbs (36.66%) (Table 8).

Table 8: Distribution of fracture in different limbs

Limbs	Number	Per cent
Fore limbs	11	36.66
Hind limbs	19	63.34
Total	**30**	**100.00**

Fracture in different side of limbs

During the study period, more number of fracture was recorded in left side limbs (66.66%) as compared to right side limbs (33.34%) in goats (Table 9).

Table 9: Distribution of fracture in different side of limbs

Side	Number	Per cent
Right	10	33.34
Left	20	66.66
Total	**30**	**100.00**

Etiology of fracture

An automobile accident (50.00%) was most common cause of fracture followed by falling from height (25.00%), hitting and dog bite (12.50%) (Table 10).

Table 10: Etiology of fracture

Etiology	No. of animals	Per cent
Automobile accident	4	50.00
Falling from height	2	25.00
Hitting	1	12.50
Dog bite	1	12.50
Total	**8**	**100.00**

During the study period, incidence of fracture at TVCC was recorded to be 1.27% in different species of animals. These findings are similar to the findings of Kumar (2016) who reported an incidence of 0.82%. Rajhans (2013) and Singh *et al.* (2015) have also reported that the overall incidence of fracture was 0.90% and 0.95%, respectively for all species of animals. However, Arora (1996) reported that overall incidence of fracture was 12.23%. The variation in incidence of fracture may be attributed to change in location and time of study.

Highest incidence of fracture was recorded in canine (58.82%) followed by caprine (19.61%), bovine (11.76 %) and others (9.81%). These findings are similar to the findings of Singh (2015) who reported fracture incidence of 61.80% in canine followed by 24.72% in caprine, 11.24% in bovine and 2.24% in other species. However, Ganesh *et al.* (1994) reported that highest incidence of fracture was in sheep and goat (62.60%) followed by cattle and buffalo (37.40%). Species-wise variation in incidence of fracture may be attributed to number of animals presented for treatment and their base population at place of study. The higher incidence of fracture, in present study in dog may be due to the fact that large population of dog is present in and around Jabalpur and as these dogs are present in urban area, they are more exposed to automobile accidents, which may be responsible for increased number of cases of facture in dogs.

The highest number of fracture was recorded in animals of age below 9 months (60.00%) followed by age group of 3 years - 5 years (23.33%) and age group of 9 months - 3 years (16.66%). Similar findings were also reported by Patel (2014), Gupta (2015) and Kumar (2016), who also reported highest incidence of fracture in goats below 9 months of age. The higher incidence of fracture in young goats in present study may be because of their more population and activeness, which makes them more prone for fracture either due to automobile accident or falling.

During the study period, the fracture was found to be more common in male animals (53.34%) than female (46.66%) animals. These finding corroborated the findings of Philip *et al.* (1998), Gupta (2015), Singh *et al.* (2015) and Kumar (2016). Higher incidence in male can be attributed to the fact that, males are more active than female, which predispose them to the factors responsible for causing the fracture.

In the present study, highest number of fracture was recorded in tibia-fibula (36.66%) followed by metatarsal (23.33%), radius-ulna (16.66%), humerus (10.00), metacarpal (6.66%) and femur (6.66%). Similar finding were also reported by Arora (1996), Aithal *et al.* (1998) and Gupta (2015) in goats. In contrary to this, Kumar (2016) have reported highest number of fracture in metacarpal followed by metatarsal in goats. The more number of fractures in tibia may be attributed to tendency of goats to suddenly flee from source of trauma like automobile or projectile stick. Being caudal part of the body, there are more chances of tibia to be trapped with a source of trauma.

Types of fracture observed during the study period were oblique (46.67%), transverse (46.67%) and spiral (6.66%). Similar findings have also been reported by Arora (1996), Patel (2014) and Kumar (2016) in goats. A plausible explanation of high incidence of oblique fracture might be, when a force less than optimal breaking force of bone, acts tangentially on any object, it get distributed un-proportionately with more force on near cortex and less force on far cortex leading to break of the nearby cortex and tear in the cortex which is away, thus creating oblique fracture in goats.

On the basis of location, the fracture was observed highest in diaphysis (56.66%) followed by distal third (33.34%) and proximal third (10.00%). Similar findings were also reported by Arora (1996) and Gupta (2015) in goats. Maximum incidence of diaphysial fracture in goats might be due to the facts that legs are highly exposed during running, jumping etc. and having less musculature over it, thus are more prone to fracture.

During the study period, among 30 cases of goats, more number of fractures was recorded in hind limbs (63.34%) than fore limbs (36.66%). Similar findings were also reported by Ganesh *et al.* (1994) and Aithal *et al.* (1998) in goats. Singh *et al.* (1983) opined that most of the fractures were caused by automobile accidents, where the animals were most likely to get injury from behind as the animals were slow to react from their hind quarters.

During the study period, more number of fracture was recorded in left side limbs (66.66%) as compared to right side limbs (33.34%) in goats. Similar findings were also reported by Aithal *et al.* (1998) in goats, however no reason has been furnished by the authors. In this study also, the reason for more fractures in left side limbs could not be explored.

An automobile accident (50.00%) was the most common cause of fracture followed by falling from height (25.00%), hitting and dog bite (12.50%) each. Similar findings were also reported by Kushwaha *et al.* (2001) who observed automobile accident (71.43%) as the main cause of fracture followed by falling from a height (28.57%). Contrary to this, Gupta (2015) found that falling from a height (37.50%) followed by an automobile accident (25.00%), hitting (25.00%) and dog bite (12.50%) were the etiology for fracture in goats. An acceptable reason behind this might be, congregation of nomadic, seminomadic and rural population keeping goats, towards the urban periphery with availability of least grazing area due to which movement of the animals takes place in the urban area and because of presence of large number of automobile in the city, the goats gets exposed to automobile accident, leading to fracture of long bones. Moreover, violent hitting of goat by stick, by the people may also be responsible for causing fracture of long bones.

CONCLUSION

The incidence of fracture was found to be 1.27%. Canine was the most common (58.82%) species to have a fracture. The incidence of fracture was highest (60.00%) in animals of age below 9 months. Further, the male animals (53.34%) outnumbered females (46.66%) for fracture cases. The tibia-fibula (36.66%) was the most common bone affected with fracture followed by metatarsal (23.33%) and radius–ulna (16.66%). Most of the fractures were oblique and transverse types and were located in midshaft of a bone. Hind limb was found more vulnerable for a fracture than fore limb. Fractures were more commonly recorded in left limbs (66.66%) of animal than the right limbs (33.34%). Automobile accident (50.00%) was found to be most common cause of a fracture.

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