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Study on incidence of fractures in bovines

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Abstract

The present study was conducted on the fractured cases in bovines reported at the Department of Veterinary Clinical Complex, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar between 2014 and 2020 has been screened from the available record to find out the incidence regarding animals affected, age, sex, breed, involvement of bone and nature of pathology.

Keywords: Fracture, bone

Introduction

A fracture occurs when there is a break in the continuity of bone, which may or may not involve the displacement of bone fragments. This break is typically accompanied by varying degrees of damage to surrounding soft tissues, such as torn blood vessels, bruised muscles, lacerated periosteum (the membrane covering bones), and contused nerves (Mahajan *et al.*, 2015) [5]. Limb fractures are more common in cattle than other fractures such as skull, spine, pelvic, and sacrum (Akin, 2017), and can be caused by self-inflicted trauma or external factors such as herd mate or farm machinery, automobile accident, and fall from height (Shivaprakash and Singh, 1999, Velavan *et al.*, 2014 and Mahajan *et al.*, 2015) [8, 11, 5]. Simple fractures in animals often open when the fractured bone is not immobilized quickly, especially in large animals (Singh *et al.*, 1983) [9]. The metacarpal and metatarsal bones in cattle were more usually broken and prone to become open due to a lack of soft tissue than the tibia and femur (Kumar *et al.*, 2018) [4].

Materials and Methods

To know the occurrence of fractures in bovine, last seven years' retrospective data on age, sex, breed, involvement of the bone, nature of pathology pertaining to the cases registered in the Veterinary Clinical Complex was collected and analyzed.

Results and Discussion

During the years 2014-2020, a total number of 868 fracture cases were recorded, and they were analyzed to find the incidence of fracture in different species. Among them, fractures reported in bovine were studied for age, sex, breed, involvement of the bone, nature of pathology. Out of 868 cases of fracture, highest 316 (36.41%) cases were in canines followed by 245 (28.23%) in bovine, 91 (10.48%) in avian, 88 (10.14%) in caprine, 55 (06.34%) in equine, 34 (3.92%) in other, 29 (3.34%) in camelid, 06 (0.69%) in feline, and 04 (0.46%) in ovine (Table 1). These findings were in accordance with those observed by Singh *et al.* (2017) [9] and Patil *et al.* (2018) [7]. The incidence of fracture varies by species, depending on the number of animals treated and the base population at the place of study.

The majority of the fracture was seen in bovine aged up to 3 years, accounting for 157 cases (64.08%). This was followed by high number of cases, i.e., 63 (25.71%) in bovine aged between 3-6 years (Table 2). Then a gradual decline was seen in the cases of fracture as the age of bovine increased. The young animals were most commonly affected by fracture followed by adult animals. These results were consistent with the findings of Tambe *et al.* (2012) [10] and Yadav *et al.* (2019) [12]. The majority of fractures were seen in bovine up to 3 years of age.

This might be due to the fact that young calves may have lower bone density and stiffness due to their lively and playful nature or their young skeletons. The highest cases of fracture, i.e., 236/245 (96.33%) were in females (92 buffaloes and 144 cattle), whereas, those of males (9 cattle) accounted for 9/245 (3.67%) only (Table 3). These findings corroborated well with the findings of Tambe *et al.* (2012) [10]. Mustafa *et al.* (2014) [6]. This could be due to higher population of females since these animals are reared by farmers for milk for their daily needs. Retrospectively, maximum cases of fracture were seen in Mehsana buffalo (36.73%), followed by HF cross cattle (34.29%), Kankrej cattle (25.71%) and Gir cattle (2.86%), whereas in Banni breeds, the incidence was 0.41% (Table 4). These findings were in concurrence with the findings of Singh *et al.* (2017) [9] and Akter *et al.* (2022) [3]. Higher incidence of fracture in Mehsana breed followed by HF cross, Kankrej than other breeds was due to higher population of these breeds of bovine in North Gujarat. This might be due to the fact that North Gujarat is well known for good animal husbandry practices and farmers are keeping the number of milch animals for milk production.

Retrospectively, maximum cases of fracture were seen in metacarpal 57 (23.27%), followed by metatarsal 47 (19.18%), femur 41 (16.73%), tibia 37 (15.10%), radius/ulna 30 (12.24%), mandible and humerus 6 (3.67%) each, pelvis 6 (2.45%), vertebra 5 (2.04%), and scapula 4 (1.63%) (Table 5). Similar findings were observed by Ferguson (1982), Mustafa *et al.* (2014) [6] and Yadav *et al.* (2019) [12]. In contrast to the study, Singh *et al.* (2017) [9] and Akter *et al.* (2022) [3] observed metatarsal fracture incidence was higher than metacarpal while, Adams and Fessler (1983) [1] observed that the incidence of tibia fracture was higher than metacarpal. In present study, majority of fractures observed in the metacarpal bone due to a lack of soft tissue protection. The most common cause of fracture in bovine were road accident 99 (40.41%), followed by falling down 63 (25.71%), hit by stick 34 (13.88%), unknown cause 27 (11.02%), fighting between animals 22 (8.98%), whereas incidence of fracture due to dog biting was zero (Table 6). These findings were in congruence with the findings of Tambe *et al.* (2012) [10].

Table 1: Species wise incidence of fracture during year 2014 to 2020

Species	2014	2015	2016	2017	2018	2019	2020	Total	Percentage
Canine	30	50	40	46	61	51	38	316	36.41
Bovine	29	33	33	34	55	42	19	245	28.23
Caprine	7	9	12	15	10	31	4	88	10.14
Equine	1	16	1	13	12	4	8	55	6.34
Feline	1	0	2	1	1	0	1	6	0.69
Camelid	8	7	1	7	2	3	1	29	3.34
Ovine	2	2	0	0	0	0	0	4	0.46
Avian	14	18	20	9	10	14	6	91	10.48
Other	3	4	3	8	6	6	4	34	3.92
Total	95	139	112	133	157	151	81	868	100.00

Table 2: Age wise incidence of fracture in bovine

Age	2014	2015	2016	2017	2018	2019	2020	Total	Percentage
Up to 3 Yr	22	19	21	22	36	28	9	157	64.08
3-6 Yr	4	8	10	9	18	8	6	63	25.71
6-9 Yr	3	3	1	0	0	4	4	15	6.12
9 Yr above	0	3	1	3	1	2	0	10	4.08

Table 3: Sex wise incidence of fracture in bovine

Sex	Male	Female	Total
Buffalo	0	92	92
Cattle	9	144	153
Total	9	236	245
Percentage (%)	3.67	96.33	100.00

Table 4: Breed wise incidence of fracture in bovine

Breed	Total No. of cases	Percentage
Gir	7	2.86
Kankrej	63	25.71
HF cross	84	34.29
Mehsana	90	36.73
Banni	1	0.41
Total	245	100.00

Table 5: Bone wise incidence of fracture in bovine

Bone	2014	2015	2016	2017	2018	2019	2020	Total	Percentage
Humerus	2	1	1	0	3	1	1	9	3.67
Radius/ ulna	2	5	4	3	5	9	2	30	12.24
Metacarpal	4	8	6	10	16	7	6	57	23.27
Scapula	0	0	1	2	1	0	0	4	1.63
Femur	7	3	7	6	11	4	3	41	16.73
Tibia	5	3	7	6	4	9	3	37	15.10
Metatarsal	6	9	6	5	10	8	3	47	19.18
Pelvic	1	0	0	1	2	2	0	6	2.45
Mandible	2	3	1	0	1	1	1	9	3.67
Vertebra	0	1	0	1	2	1	0	5	2.04
Total	29	33	33	34	55	42	19	245	100.00

Table 6: Etiology wise fracture in bovine

Etiology	2014	2015	2016	2017	2018	2019	2020	Total	Percentage
Falling down	8	9	6	8	15	11	6	63	25.71
Fighting	3	4	3	2	8	2	0	22	8.98
Dog biting	0	0	0	0	0	0	0	0	0.00
Road accident	10	15	18	15	19	15	7	99	40.41
Hit by stick	5	3	6	4	7	8	1	34	13.88
Unknown	3	2	0	5	6	6	5	27	11.02
Total	29	33	33	34	55	42	19	245	100.00

Conclusion

The highest incidence of fracture was observed in bovine up to 3 years of age and in females than in males. The most affected bone was metacarpal followed by metatarsal, femur, tibia and radius/ulna. The road accident was found to be the most common cause of fracture.

Conflict of Interest

Not available.

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