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Study on incidence of fractures with respect to breed, age, sex, type and location of fractures and bone involved

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Abstract

The present study was conducted on the fractured cases in companion animals reported at Department of veterinary surgery and radiology, Ranchi veterinary college, Kanke, Ranchi between Jan 2012 to Dec 2017 has been screened from the available record to find out the incidence regarding animals affected, aetiology, age, sex, breed, type of fracture and method of fracture fixation.

Keywords: Fracture, breeds susceptible, bones involved, fracture management

Introduction

Fracture of long bones in animals is the most common orthopaedic condition encountered by veterinary practitioner. The management of fractures may vary with type and location of fracture, bone involved, species, breed and age of the animal. The treatment of fracture may vary that is depending upon the infrastructure of hospital and surgeons choice. The incidence of fracture at particular locality is utmost important to find out the development of infrastructure, facilities and skill for the management of fracture. Among the different domestic animals, dogs are more prone to automobile accidents leading to fractures. The most common type of long bone fractures in dog includes femur and tibia representing 45% and 26% of fractures respectively (Ali, 2013) [2].

Femur fractures commonly occur in dog following different kinds of trauma sustained by motor vehicle accidents or fall from height (Aithal *et al.*, 1999) [1] (Beale, 2004) [3] (Harasen, 2003) [9]. Although metaphyseal and diaphyseal fractures were more common in mature dogs, proximal or distal physeal fractures were common in young dogs (Tercanlioglu and Sarierler, 2009) [31]. Assessment of inherent stability of the fracture is important in selection of fixation methods.

Fracture can be classified as stable and unstable (Piermattei *et al.*, 2006) [21]. Stable fractures are incomplete fractures or fracture where fragments are locked to each other and prevent shortening of bone. Whereas, unstable fractures are not locked to each other and the fractured ends are not in apposition and generally results in overriding and shortning of limb (Denny and Butterworth, 2000) [7]. Therefore, unstable fracture requires open methods of fixation that maintain the length of the bone. Unstable fractures can be treated by using a variety of surgical techniques and may sometime involve a combination of techniques. These fractures are generally treated by bone plating (Illukka and Boudrieau, 2014) [11], external skeletal fixation (Harasen, 2003) [9] (Nagaraju *et al.*, 2014) [19] (Tyagi *et al.*, 2012) [34], cross pinning (Raghunath *et al.*, 2012) [22], Intramedullary pinning, wiring (Singh and Saha, 2012) [27], and Stack pinning (Bean, 1998) [5].

Important factors taken into consideration in repair of femur fracture include suitable surgical technique, preservation of regional soft tissues and their attachments to bone fragments, either anatomic or indirect reduction, adequate stabilization, appropriate preference and application of implant device and proper postoperative care (Stiffler, 2004) [30].

Various internal fixation techniques like Rush pinning, T-plating, Schanz screwing, End threaded pinning, Cross pinning, Parallel pinning, Pin screw combination, Dynamic compression plating, Plate rod combination and Pin wire combination etc., have been used to repair such fractures with varied results.

Intramedullary pin fixation for fracture treatment in small animals started in 1940 (Brinker and Flow, 1975) [4]. Now it is one of the most commonly used methods of internal fixation in small animals. There are many advantages of pin fixation over other methods of internal fixation. Intramedullary pins act as internal splints of medullary canal of long bone that shares loading with bones, maintain axial alignment of the fracture and resist bending forces in all directions applied to the bone (Beal, 2004) [3]. Intramedullary pins are minimally traumatic as they interfere with endosteal, not with periosteal callus formation (Stiffler, 2004) [30]. Pin fixation is less expensive and instruments needed for fixation are easily available. Most pins and wire fixation require less surgical exposure resulting in less tissue damage and less vascular damage with enhancing healing. In general, pins and wire can be applied in less time, thus decreasing anaesthesia time. Pins are usually much easier to remove under simple sedation and local analgesia.

Material and Method

Clinical cases of fractures treated in the department of Vet. Surgery and Radiology, Ranchi Veterinary College, from 2012 to 2017 were screened for the fractures in different bones of domestic and pet animals. The information regarding etiology, species, breed, age and sex of the animals, type of fracture and method of fracture fixation were recorded and tabulated.

Results

A total of 261 cases of fracture has been reported in the present study from January 2012 to December 2017, which comprised of high percentage of dogs (75.86%) followed by sheep/goat (10.34%), cattle and buffalo (4.98%), Rabbit (5.36%), parrot (1.91%) and cat (1.53%)(Table-1). Automobile accident was the major cause of fracture in 129 cases (65.15%) followed by fall from height in 43 cases (21.71%) and then fighting amongst each other in 13 cases (6.56%). In dogs out of 198 cases, 13 cases were found with unknown etiology (Table-2).

Non-descript dogs were commonly affected with high percentage in 76 cases (38.38%) out of 198 cases. Among the breeds, German shepherd with 39 cases (19.69%) were commonly affected followed by Labrador (17.17%), Belgium shepherd (6.56%), Rottweiler (5.55%), Doberman pinscher (5.05%), Pomeranian (4.04%) and Pug (3.53%) (Table-3).

Aged of 6 month-2 year (41.41%) was affected more followed by 2 year and above (35.35%) and then 1 to 6 month (23.23%)(Table-4). Out of 198 cases of fracture in dogs, males were affected more (60.10%) followed by female (39.89%)(Table-5). Complete fracture was found in 114 cases (57.57%) as compared to incomplete fracture, where it was recorded in 84 cases (42.42%)(Table-6).

Plaster of paris (POP) application, Bandaging, Intramedullary pinning, Plating, Splint and External skeletal fixation were used as a methods for external and internal immobilization of fracture in dogs screened from record of Department of veterinary surgery and radiology from January 2012 to December 2017.

Plaster of paris application was most commonly used method as much in 74 cases (37.37%) followed by bandaging in 43 cases (21.17%) and then splint fixation in 15 cases (7.57%) in external immobilization technique. Whereas, intramedullary pinning was the most commonly used method in 46 cases (23.23%) followed by plating in 18 cases (9.09%) and external skeletal fixation in 2 cases (1.01%) in internal

immobilization technique (Table-7).

Table 1: Incidence of fracture in different species between January 2012 to December, 2017

Species	Number	Percentage
Dog	198	75.86
Sheep/Goat	27	10.34
Cattle/Buffalo	13	4.98
Cat	4	1.53
Rabbit	14	5.36
Parrot	5	1.91
Total	261	

Table 2: Etiology of fracture in dog

Etiology	Number	Percentage
Fall from height	43	21.71
Automobile accident	129	65.15
Fighting	13	6.56
Unknown	13	6.56
Total	198	

Table 3: Breed wise distribution of affected dogs

Species	Number	Percentage
German Shepherd	39	19.69
Labrador	34	17.17
Pomeranian	8	4.04
Dobermann Pincher	10	5.05
Rottweiler	11	5.55
Belgium Shepherd	13	6.56
Pug	7	3.53
Non-descript	76	38.38
Total	198	

Table 4: Age wise distribution of affected dogs

Age	Number	Percentage
1-6 month	43	21.71
6 month-2 year	79	39.89
2 year and above	67	33.83
Total	198	

Table 5: Sex wise distribution of affected dogs

Sex	Number	Percentage
Male	119	60.10
Female	79	39.89
Total	198	

Table 6: Types of fracture

Types	Number	Percentage
Complete	114	57.57
Incomplete	84	42.42
Total	198	

Table 7: Methods of fixation (immobilization)

Method	Number	Percentage
POP	74	37.37
I M pinning	46	23.23
Plating	18	9.09
External fixation (splint)	15	7.57
Bandaging	43	21.71
External skeletal fixation	2	1.01
Total	198	

Discussion

A total of 261 cases of fracture between January 2012 to

December 2017 has been screened from available recorded in which dogs were reported with high percentage as compared to other animals might be due to greater population and awareness among the people with companion animals.

Automobile accident was the major cause of fracture in concurrence with the finding of (Fossum, 2007) [8], (Tercanlioglu and Sarierler, 2009) [31]. The second most cause of fracture was fall from height similar to the finding of (Jani *et al.*, 2014) [12]. In contrary to this (Harikrishna, 2013) [10] reported that the most common cause of fracture was fall from height followed by miscellaneous cause of direct injury to bone in dog.

Non descript dog were commonly affected followed by German shepherd, Labrador, Pomeranian and Pugs. Greater number of fracture reported in non descript dogs followed by German shepherd could be due to more population nearby Ranchi district accordance with the findings of (Thiloe and Balasubramaniam, 1988) [32], (Aithal *et al.*, 1999) [1], (Mathew, 2009) [17], (Simon *et al.*, 2010) [26], (Manjunath, 2010) [16]. Non descript dogs mostly remained on street where they were more likely to come across with external trauma particularly road traffic accident, that's why road traffic accident was found to be the major cause of fracture and non descript dogs are commonly affected animals. (Rathod *et al.*, 2013) [24] and (Singh *et al.*, 2015) [29] also reported that high incidence of fracture among the nondescript dogs. However (Ali, 2013) [2] reported that German shepherd was the most common breed followed by Wolf, Mongrels and other breeds. Aged 6 months to 2 years (41.41%) was more affected followed by 2 year and above (35.35%) and then 1 month to 6 month. The higher incidence of fracture in young dogs between 6 month to 2 year age in the present study might be due to fact that in this age group the bone is in developing stage and soft nature makes the bone more fragile to have fracture with some forces [25]. This is also justifying with the reason that young dogs are more playful and more active and not able to identify the hazards unlike older counter parts [1]. Higher incidence of fracture in young animals has also been reported by various workers (Aithal *et al.*, 1999) [1] (Kolata and Johnston, 1975) [14] (Minar *et al.*, 2013) [18] (Simon *et al.*, 2010) [26].

Out of 198 cases of fracture in dogs, males were affected more accounting 60.10 percent as compared to females with 39.89 percentages. This is accordance with the findings of various workers (Aithal *et al.*, 1999) [1] (Kaur *et al.*, 2015) [13] (Mahajan *et al.*, 2007) [15] (Manjunath, 2010) [16] (Mathew, 2009) [17] (Rani *et al.*, 2004) [23] (Simon *et al.*, 2010) [26] (Singh *et al.*, 2015) [29]. Males are more aggressive and tend to wonder more than females which make them more prone to fracture due to fall and accidents [1]. More number of fracture cases reported in males dogs might also be attributed with fact that people have more preference for male dogs, thus population of male dogs nearby Ranchi district has been increased with respect to female dogs.

Complete fracture was found to be more as compared to incomplete fracture in present study might be due to the fact that most of dogs come across with road traffic accident maximally followed by fall from height. This is also justified that more presentation of complete fractured cases in the clinic with increase in awareness in pet owners as animals did not wear weight on affected limbs and suffered with more pain as compared to incomplete fracture.

Out of 198 cases, plaster of paris application was most commonly used method in 74 cases followed by

Intramedullary pinning in 46 cases, Bandaging in 43 cases, Plating in 18 cases, Splint in 15 cases and External skeletal fixation in 2 cases. Plaster of paris is considered as most practical method for external immobilization (Tyagi and Singh, 1993) [33] and intramedullary pinning is considered as most commonly used internal immobilization (Uddin *et al.*, 2017) [35] in the management of femur and tibia fracture in dogs. Intramedullary pinning acts usually as internal splint of medullary canal of long bone that share loading with the bone by keeping axial alignment of fracture and resist bending forces in all direction applied to the bone [3]. Most of the cases from previous records were managed with intramedullary pinning in present study might be due to fact that it is easy to perform with limited resources and economical. It has mentioned that intramedullary pins are supreme for shaft fracture of the femur in small dogs and cats [20]. Intramedullary pinning was justified simplest in situation when rotation can be managed.

Conclusion

The present study was conducted on the fractured cases in companion animals reported at Department of Veterinary Surgery and Radiology, Ranchi Veterinary College, Kanke, Ranchi for the treatment. The study has been conducted in two parts. In part one the fractured cases reported between January 2012 to December 2017 have been screened from the available record to find out the incidence regarding animals affected, etiology, breed, age, sex, types of fracture and method of fracture fixation. In part two the study has been conducted on femur and tibia fracture in 15 clinical cases on either sex presented for the treatment at Department of Veterinary Surgery and Radiology, Ranchi Veterinary College, Kanke Ranchi.

The incidence was found to be 75.86% in dogs in total number of fractured cases (261) reported in Ranchi Veterinary College during January 2012 to December 2017.

Automobile accident was the major cause of fracture with 65.15% followed by fall from height with 27.61%. Maximum no of fractured cases were reported in non- descript breed (76) followed by German shepherd (39), Labrador (34), Belgium Shepherd (13), Rottweiler (11), Doberman (10), Pomeranian (8) and Pug (7). Age wise incidence was maximum in 6 month to 2 year (82) followed by 2 year and above (70) and then 1 month to 6 month (46). Male dog was affected more with 60.10% followed by female 39.90%. Out of 198 cases of fracture in dogs the complete fracture was reported in 114 cases and incomplete fracture was recorded in 84 cases. Complete fracture was found in 114 cases (57.57%) as compared to incomplete fracture, where it was recorded in 84 cases (42.42%). The fracture has been managed maximally with the help of POP (74) followed by Intra medullary pinning (46) then bandaging (43) and then plating (18).

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