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PELVIC FRACTURE: SURVEY OF FRACTURE LOCATION AND PROFILE OF DOGS TREATED IN THE ORTHOPEDICS DEPARTMENT OF HCV/ UFRGS FROM 2021 TO 2023

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Abstract: Pelvic fractures are common in the clinical-surgical routine of small animals, mainly caused by automobile accidents. They account for between 16% and 30% of all fractures in dogs. Establishing an accurate and early diagnosis of these injuries is crucial to determining the appropriate clinical and surgical management, adapted to the specific needs of each patient. The aim of this study was to identify the profile of patients and the occurrence of pelvic fractures in dogs treated at the UFRGS Veterinary Hospital between 2021 and 2023. Data from 38 dogs with pelvic fractures were analyzed, including breed, age, gender, location of the fracture, presence of luxations, cause of the fracture and type of treatment (conservative or surgical). Among the animals analyzed, the majority were female (60.5%), predominantly under three years old (39.5%), and of undefined breed (63.1%). Car accidents were identified as the main cause of fractures (92.1%), with 81.6% of cases involving multiple fractures. Fractures of the pubis were the most common (78.9%), followed by fractures of the ilium (60.5%), ischium (57.9%) and acetabulum (26.3%), which could occur simultaneously in each animal. Sacroiliac dislocations were observed in 36.8% of cases. Surgical treatment was performed in 23.6% of cases, while 63.1% received conservative treatment. These findings highlight the complexity and severity of pelvic fractures in dogs, emphasizing the need for a thorough diagnosis and well-structured therapeutic planning to minimize complications and promote the well-being of affected animals.
Keywords: osteology; thigh; orthopedics; veterinary; canine.

INTRODUCTION

The pelvis is made up of the ilium, ischium and pubis bones, which come together to form the acetabulum. It is essential for the protection and support of the pelvic limbs, as it is where the femoral head articulates (Evans, 1993). Pelvic fractures are common in dogs, with incidences ranging from 16% to 30% (DeCamp, 2012; Piermatei *et al*., 2006). Usually caused by car accidents, they present clinical signs such as lameness, pain, deformities and, in severe cases, may involve rupture of abdominal organs (DeCamp, 2012; Oliveira, 2013; Fossum, 2015).

Diagnosis is based on clinical signs and radiographs of the pelvic region (Bush, 2016), and computed tomography is recommended for complex fractures, especially fractures acetabular (Fossum, 2015; Stieger-Vanegas *et al*., 2015). Treatment varies according to the severity of the fracture and the condition of the animal, and can be conservative (rest, therapy and immobilizationnon-surgical) or surgical (use of orthopaedic implants to stabilize the fragments) (Oliveira, 2013). The choice between methods depends on the stability of the fracture, its location and the financial conditions of the owner (Piermatei *et al*., 2006; Fossum, 2015).

With the aim of collecting data on the occurrence of pelvic fractures in dogs, this study checked information from the system at Simplesvet the Hospital de Clínicas Veterinárias (HCV) of the Federal University of Rio Grande do Sul (UFRGS) between 2021 and 2023. In addition, data on dogs with pelvic fractures, including breed, age group, gender, location of the fracture, presence of luxations, cause of the fracture and type of treatment performed (conservative or surgical).was analyzed

MATERIAL AND METHODS

This study was conducted through a retrospective analysis of dogs treated at the Hospital de Clínicas Veterinárias (HCV) of the Federal University of Rio Grande do Sul (UFRGS) over a three-year period, from 2021 to 2023. The computerization of records from 2021 onwards facilitated access to essential data, focusing on the review of radiographic reports, records of orthopedic consultations and surgical interventions carried out at the HCV/UFRGS, using the system's catalog of records Simplesvet.

The records of dogs treated in the orthopedics, radiology and veterinary surgery departments at HCV/UFRGS were analyzed, totaling 210 consultations, 1560 surgeries and 3150 radiographic reports during the period in question. Patients who received orthopedic care and had radiographic examinations of the pelvis views were selectedin the laterolateral and ventrodorsal.

Subsequently, the radiographic reports of dogs diagnosed with pelvic fractures were reviewed, initially totaling 42 reports. Of these, four were excluded due to lack of identification, treatment or clinical-surgical follow-up data in the systemSimplesvet.

The remaining 38 cases were analyzed in terms of race, age, gender, location of the fracture, presence of concomitant dislocations, cause of the fracture and type of treatment (conservative or surgical). This information was selected because it was consistently documented in the radiographic reports reviewed.

RESULTS

During the selected period, the majority of the 38 dogs diagnosed with pelvic fractures were female, accounting for 60.5% (n = 23), while males accounted for 39.5% (n = 15). The average age of these animals was five years and 39.5% (n = 15) were up to three years old, 34.2% (n = 13) were between three and seven years old and 26.3% (n = 10) were over seven years old (Graph)1.

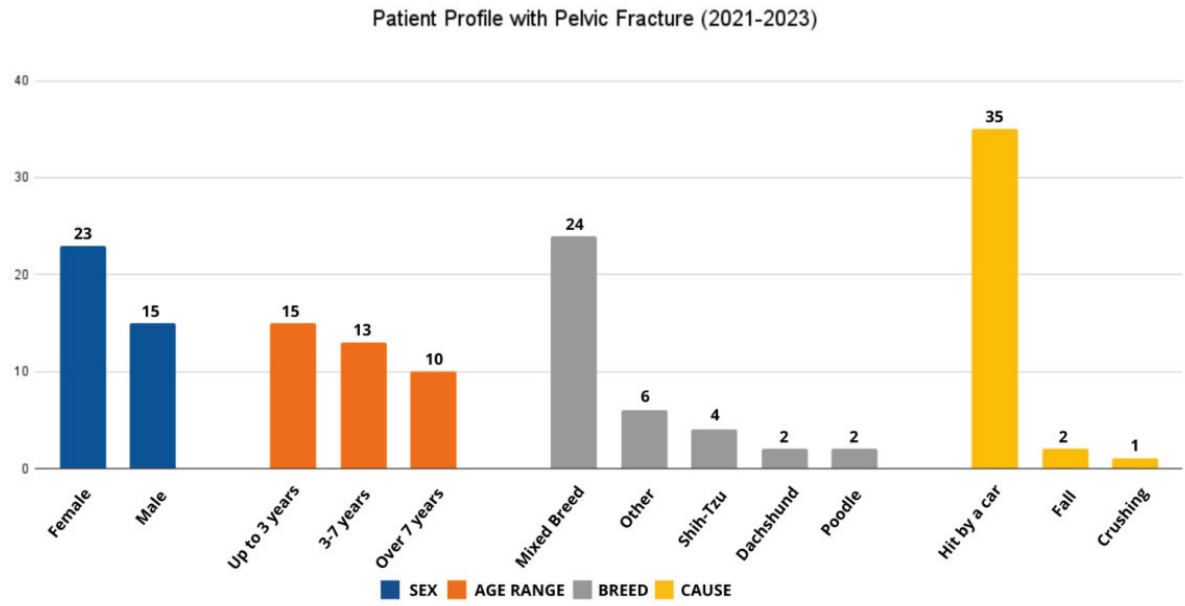
Most of the animals were non-defined breeds (SRD), corresponding to 63.1% (n = 24). In addition, dogs of the breeds were identifiedShih-Tzu, representing 10.5% (n = 4), Poodle with 5.3% (n = 2), Dachshund also with 5.3% (n = 2), and other breeds, totaling 15.8% (n = 6), each representing one case. The main cause of the fractures was being hit by a car, accounting for 92.1% (n = 35) of the cases, followed by falls with 5.3% (n = 2) and crushing with 2.6% (n = 1) (Graph)1.

Among the 38 dogs selected, fractures in different regions of the pelviswere identified. A total of 84 fractures were diagnosed in the reportsradiographic, and 81.6% (n = 31) of the animals had multiple fractures. Of the 84 fractures in the regionpelvic, the majority were pubic fractures, corresponding to 76.3% (n = 29) of the dogs analyzed (Table 1)

Fracture	No. of Patients	% of patients
Ilium	23	60,5
Ischium	22	57,8
Pubis	29	76,3
Acetabulum	10	26,3

Table 1 - Table of pelvic fractures indicated in the radiographic reports of the dogs at HCV/UFRGS, over a three-year period (2021-2023), from a total of 38 patients.

Source: Prepared by the author.



Graph 1 - Profile graph of the dogs selected for this study with pelvic fractures who were treated at the HCV/UFRGS over a three-year period (2021 - 2023), including sex, age group, breed and reason for the fracture.

Source: Prepared by the author.

Of the 84 fractures analyzed, 25% (n = 21) occurred bilaterally, with a higher occurrence in the pubis, which accounted for 31% (n = 9) of all pubic fractures (n = 29) (Table 2). Furthermore, among the 38 animals evaluated, 39.5% (n = 15) had bilateral fractures in two or more areas of the pelvis simultaneously, including the ilium, ischium, pubis or acetabulum.

Location	No. of Bilateral Fractures	%	No. of fractures Unilateral	%
Ilium	6	26,1	17	73,9
Ischium	5	22,7	17	77,3
Pubis	9	31,0	20	68,9
Acetabulum	1	10	9	90

Table 2 - Table of bilateral and unilateral pelvic fractures indicated in thereports radiographic of dogs treated at HCV/UFRGS over a three-year period (2021-2023).

Source: Prepared by the author

Of the 38 animals evaluated, 52.6% (n = 20) were diagnosed with a concomitant joint injury, while 7.9% (n = 3) had two concomitant joint injuries, totaling 23 cases with joint injuries together with fractures. It was observed that most of the cases, 36.8% (n = 14), had sacroiliac dislocation (SSI), 18.5% (n = 7) had hip dislocation (HFD) and 5.3% (n = 2) had pelvic symphysis dislocation (PSD).

As for treatment, of the 38 animals selected for the study, 23.7% (n = 9) underwent surgery, while 63.1% (n = 24) received conservative treatment. In 13.2% of cases (n = 5), there was no definition of treatment due to patients being referred to other hospitals.

DISCUSSION

The data provided offers a comprehensive view of pelvic fractures in dogs, highlighting various characteristics and patterns found in different studies. For example, the present study of 38 dogs revealed that 81.6% of them had multiple fractures, a finding similar to a retrospective study of 889 dogs, where 86.3%

of cases were identified as polyfractured (Souza *et al*., 2011). These results underscore the high incidence of complex injuries in this region, highlighting the seriousness of fractures in animals.

No data was found relating dog breeds and the diagnosis of pelvic fractures, but this study found a higher occurrence in SRDs, followed by the breeds Shih-Tzu, Poodle and Dachshund respectively.

In addition, it was observed that 39.5% of the dogs analyzed in this study were up to three years old, a figure close to that of Souza *et al*. (2011), who found that 52% of dogs with pelvic fractures were young. This suggests that young dogs are more vulnerable to these injuries, possibly due to more active behavior and less experience in risky situations. As for gender, there was a predominance of females-female, accounting for 60., 5%whichis similar when compared to the study by Souza *et al*. (2011), where 54.9% of the animals were also.

Being hit by a car was identified as the main cause of pelvic fractures in dogs, significantly affecting 92.1% of the cases in this study, in line with previous findings (DeCamp, 2012; Souza *et al*., 2011). This emphasizes the importance of accident prevention and proper animal control to mitigate these serious incidents.

Among the dogs evaluated, 25% (n = 21) had bilateral fractures, a percentage equal to that found in a larger study of 556 cases, where 25% of the dogs also had bilateral fractures (DeCamp, 2012). This coincidence suggests a consistency in the data on the occurrence of bilateral fractures in dogs, regardless of the sample size. Furthermore, the repetition of this rate in different studies reinforces the importance of considering bilateral fractures in the assessment and treatment of trauma in dogs, as this condition can have significant implications for prognosis and therapeutic planning.

Iliac were observed in 60.fractures 5% (n = 23) of the cases in the current study, but when compared to the study by Kemper (2008), in which 85% of the animals had iliac fractures, there was a significant decrease in the number of cases. No data on the incidence of ischium and pubis fractures was found in the literature for comparison purposes, but these types of fractures were highly prevalent in this study. As for acetabular fractures, they were found in 26.3% (n = 10) of the 38 animals studied, a rate higher than that reported in the literature, where acetabular fractures account for up to 12% of pelvic fractures (DeCamp, 2005 *apud* Harasen, 2007, p. 427).

In the present study, sacroiliac luxations were observed in 36.8% of cases, corroborating the findings of Piermattei *et al.(*2006), who indicate that these injuries make up 41% of pelvic fractures. The relationship between dislocations and pelvic fractures in dogs reveals an additional complexity in the clinical management of these injuries. The presence of sacroiliac luxations can aggravate the clinical condition of animals, requiring more careful and personalized treatment. Of the 38 animals evaluated in this study, 52.6% (n = 20) had at least one concomitant joint injury, while 7.9% (n = 3) had two joint injuries in addition to the fractures. This indicates a considerable severity in the condition of patients with joint injuries associated with pelvic fractures, reflecting the complexity and severity of the trauma suffered. In addition, the coexistence of fractures and luxations can significantly affect the mobility and quality of life of dogs, requiring rigorous, long-term clinical follow--up. Therefore, recognizing the high incidence of sacroiliac luxations and concomitant joint injuries in dogs with pelvic fractures is crucial for designing more effective treatment protocols and improving clinical outcomes.

The choice between surgical and conservative treatment for pelvic fractures in dogs is a complex decision that must take into account several factors, including the severity of the injury, the presence of associated joint injuries and the patient's general condition. In this study, of the 38 animals evaluated, 23.7% (n = 9) underwent surgery, while the majority, 63.1% (n = 24), received conservative treatment. In 13.2% of the cases (n = 5), it was not possible to define the treatment due to patients being referred to other hospitals and, in one case, the patient died before treatment began.

The decision to perform surgery is usually motivated by the need to stabilize fractures, especially in cases of complex fractures, fractures comminuted or fractures that compromise pelvic stability (Souza *et al*., 2011). Furthermore, in situations where there are concomitant joint dislocations, surgical correction may be essential to restore proper joint function and prevent complications long-term such as osteoarthritis (Fossum, 2015). On the other hand, conservative treatment may be a viable option in cases of less severe fractures, where management includes adequate immobilization, pain control and physiotherapy to promote bone healing and functional recovery (Piermatei *et al*., 2006). This approach may be preferred in animals with underlying medical conditions that increase surgical risk, in patients of advanced age or in situations where surgery does not offer clear benefits over conservative treatment (Piermatei *et al*., 2006).

The lack of definition of treatment in some cases, due to referral to other hospitals or the loss of the patient before treatment begins, highlights the challenges faced in daily clinical practice. These aspects show the importance of a careful, individualized assessment of each case, based on a thorough clinical evaluation, detailed imaging tests and discussion with the tutors about treatment options and expected prognosis.

These findings underline the importance of a comprehensive and individualized clinical approach to the treatment of pelvic fractures in dogs, considering not only the main fracture but also concomitant joint injuries. Early diagnosis of these conditions using methods such as computed tomography is crucial for planning appropriate therapeutic interventions, which can include both surgical correction of fractures and management of associated luxations, with the aim of functional recovery and quality of life for patients (Fossum, 2015).

CONCLUSION

The results of this study provide a detailed overview of pelvic fractures in dogs, highlighting that the majority of cases occur in females and dogs under three years of age, often of an breedundefined. Being run over is the predominant cause of these fractures, affecting nine out of ten cases. The high incidence of bilateral fractures in areas such as the pubis, ilium, ischium and acetabulum is significant. The complexity of the injuries, such as sacroiliac dislocations and specific acetabular fractures, highlight the various associated complications. This information emphasizes the importance of precise therapeutic approaches, whether surgical or conservative, to ensure effective patient recovery. The clinical management of these injuries requires a thorough diagnosis and a well-structured therapeutic plan to minimize sequelae and promote the well-being of the affected animals.

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