

Surgical management of transverse fracture of wing of right ilium in a Cocker Spaniel - A case report

D. Pal¹, S. M. Tripathi¹, C. Soni¹ and S. Halder^{1*}

¹Department of Veterinary Surgery and Radiology, West Bengal University of Animal and Fishery Sciences, Kolkata-700 037, West Bengal, India

Abstract

An English Cocker Spaniel aged 2.6 years was presented in the emergency ward with signs of severe pain in the hip, non-weight bearing of hind limbs, and a history of fall from height. Clinical and radiographic evaluation revealed a fracture of the wing of the right ilium. The surgical management was done by placing a dynamic compression plate (DCP). The surgery was done under injectable general anaesthesia using zoletil-50 @ 1 mg kg⁻¹ body weight as induction after atropine sulfate and xylazine as pre-anaesthetics, @ 0.04 and 1 mg kg⁻¹ body weight, respectively. Postoperative immobilization of the hip was done, and the dressing was advised in a routine manner along with necessary medications. Postoperative anaesthetic recovery was without any complications. The postoperative X-ray showed a good alignment of the fractured segments with proper positioning of the plate. The dog was observed for 60 days post-operatively, and the recovery was uneventful.

Keywords: English Cocker Spaniel, Fracture, Iliac wing

Highlights

- Right iliac wing fracture of an English Cocker Spaniel caused by fall from height.
- Anaesthetized with tiletamine and zolazepam.
- Paranaesthesia was done using atropine sulfate and xylazine.
- Placement of a contoured dynamic compression plate for fracture stabilization was done.
- Postoperative immobilization along with cage rest was advised.

In canine patients, ilium fracture is one of the common orthopaedic issues including pelvic fractures, which often require careful surgical interventions (Ergin *et al.*, 2016). To regain mobility and stable gait, it is important to address the situation with careful monitoring and approach at the earliest (Kenzig *et al.*, 2017). Also, while approaching internal immobilization, there are high chances for the screws or pins to reach beyond the medial border and might also damage the sacral plexus passing along the inner border of ilium and ischium (Jäckle *et al.*, 2023). In dog, 20-30% of the fractures observed correspond to pelvic fractures, mainly because of traumas and accidents. Though external fixation includes itself as an option, compared to internal stabilization, it faces more complications, and the chances of failure are higher in the former technique (Fitzpatrick *et al.*, 2008).

A 2.6-year-old English Cocker Spaniel was brought to the emergency ward with a history of fall from a height on the previous day, and on physical and clinical examination, it showed excessive pain in the hip, elevated heart rate and respiration rate, unable to bear weight on corresponding the hind limbs. The X-

ray revealed a transverse fracture of the right iliac wing along with an extended fracture line up to the level of ischium (Fig. 1). The defecation and urination were unhampered. Among several methods of internal fixing, such as leg screw fixation, and plate fixation, the surgical plan was constructed pointing towards the reduction and stabilization of the fractured wing internally by plating with DCP.

The patient was advised for cage rest along with pain medications, i.e. carprofen @ 4.4 mg kg⁻¹ and blood sample was sent for haematology and biochemistry profile examination.

Twelve hours of fasting and six hours of water withdrawal were advised before surgery. Haematological (Haemoglobin, Packed Cell Volume, Erythrocyte Sedimentation Rate) and biochemical parameters (Serum Glutamic Oxaloacetic Transaminase, Alkaline Phosphatase, Blood Urea Nitrogen, Creatinine, Fasting Blood Sugar) were within the normal physiological range. Pre-operative preparations were done aseptically. The dog was pre-anaesthetized with atropine sulfate @ 0.04 mg kg⁻¹ body weight subcutaneously (Behnke *et al.*, 1995) and xylazine @

*Corresponding Author, E-mail: samarvet@gmail.com

1 mg kg⁻¹ body weight intramuscularly (Cassu *et al.*, 2014). Injectable general anaesthesia was done by using Zoletil-50 (zolazepam and tiletamine) @ 1 mg kg⁻¹ body weight intravenously for induction and the same combination for maintenance. Ceftazidime @ 20 mg kg⁻¹ body weight intravenously (Monfrinotti *et al.*, 2010) and meloxicam @ 0.2 mg kg⁻¹ body weight intramuscularly (Montoya *et al.*, 2004) were administered along with isotonic peri-operative fluid administration, and the surgical site was cleaned and draped as the routine procedure (Fig. 2). The incision was given from the tuber coxae to the greater trochanter of the femur. The surgical site was accessed using a routine procedure, and Gelpi Retractors were placed. The fracture parts were reduced with the help of burns bone holding forceps. A 3.5 mm eight (8) hole stainless steel dynamic compression plate (DCP) was held along with the lateral border of the reduced right iliac wing with the help of a plate holding forceps (Fig. 3). Anterior one-third of the DCP was contoured to match the alignment of the wing border. Two 18 mm and one 14 mm self-tapping cortical screws were placed in the proximal section of the fractured part, and one 14 mm and 12 mm cortical screws were inserted distal to the fracture site (Fig. 4). The screw size was selected by measuring the drilled holes with the help of a depth gauze. Antibiotic lavage was done after completing the plate placement. The surgical site was closed in a routine manner. The postoperative radiograph showed a proper reduction of the fractured segments along with proper alignment of the DCP (Fig. 5).

Post-anaesthetic recovery was uneventful, the site was dressed, and the hip was immobilized with the help of orthopaedic cotton pads and bandages. The animal was advised for alternate dressings (Fig. 6) for one week, bandage changed along with necessary medications including antibiotic, and non-steroidal anti-inflammatory (NSAID) drug for a week, and calcium supplementation along with complete cage rest for 45 days.

Sixty days postoperative follow-up showed uneventful recovery with the return of the weight-bearing capacity, normal gait, and posture.

To the author's knowledge, comparative studies have been done between the application of external fixators and plating of iliac wing fractures, and stiffness was also compared between canine (Fitch *et al.*, 2002) and human (Liu *et al.*, 1995) pelvis fractures. Among

several types of fixation, the application of DCP has better stiffening capacity along with stronger immobilization compared to the external fixation techniques (Breshears *et al.*, 2004). Though failures are often ascribed to improper selection of implant or application, and screw loosening in this kind of lateral plating is a concern, especially in the cranial segment due to stress concentration (Kenzig *et al.*, 2017), in this case, such failures didn't occur at any point. Sometimes, implant failure further leads to displacement of the fractured ends, ultimately leading to non-reunion due to the lack of contact between the ends. Proper external coaptation is necessary to counter these forces and displacement even after implanting the internal devices. In recent studies, locking plates have been recommended to prevent short-term implant failure risk, and the toggle effect has been noticed to be mitigated unlike non-locking plates. In a few studies, narrowing of pelvic canal was also observed though they have possessed minimal clinical consequences as a postoperative health concern in dogs (Hamilton *et al.*, 2009).

In cases like this, proper clinical and radiographic assessment is the first step in planning surgical options. Among the choices of procedures, plating with DCP possesses fewer complications and failure, and also provides the necessary stability to the fractured site compared to many other interventions. Though better stabilization methods can be chosen for iliac wing fracture, in this study the DCP application resulted in uneventful recovery, and no failures or complications were observed throughout the evaluation.

Conflict of interest: Authors have no conflict of interest in this study.

Author's contribution: DP: Participated in surgical management, postoperative follow-ups, data compiling, and writing the original draft; SMT: Carried out planning and surgical management; CS: Participated in the surgical management and presentation; SH: Carried out the surgical management, data analysis, overlooking, and revision of the manuscript.

Data availability statement: This article includes all data generated or analyzed during this study. The corresponding author is willing to provide the raw data upon reasonable request.

REFERENCES

- Behnke DJD, Swart GL, Spreng D and Aufderheide TP, 1995. Standard and higher doses of atropine in a canine model of pulse less electrical activity. *Acad Emerg Med*, 2(12): 1034-1041, doi: 10.1111/j.1553-

2712.1995.tb03145.x

- Breshears LA, Fitch RB, Wallace LJ, Wells CS and Swiderski JK, 2004. The radiographic evaluation of repaired canine ilial fractures (69 cases). *Vet Comp Orthop Traumatol*,

Right iliac wing fracture in a dog



Fig. 1. Radiographic evaluation



Fig. 2. Preparation of surgical site

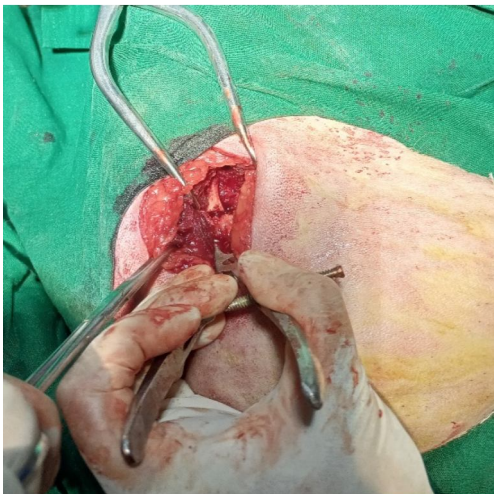


Fig. 3. Reduction of fractured part



Fig. 4. Screw placement



Fig. 5. Postoperative radiograph



Fig. 6. Postoperative first follow-up dressing picture with antibiotic ointment

17(2): 64-72, doi: 10.1055/s-0038-1636484

Cassu RN, Melchert A, Canoa JTB and de Oliveria Martins PD, 2014. Sedative and clinical effects of the pharmacopuncture with xylazine in dogs. *Acta Cir Bras*, 29(1): 47-52, doi: 10.1590/S0102-86502014000100007

Ergin Ý, Benel OO, Özdemir Ö, Uluhan S and Bilgili H, 2016. Evaluation and surgical treatment of sacroiliac fracture-luxations in 28 cats and 25 dogs. *Ankara Üniv Vet Fak Derg*, 63(2): 127-136, doi: 10.1501/Vetfak_00000002720

Fitch RB, Hosgood G and Staatz A, 2002. Biomechanical evaluation of triple pelvic osteotomy with and without additional ventral plate stabilization. *Vet Comp Orthop Traumatol*, 15(3): 145-149, doi: 10.1055/s-0038-1632729

Fitzpatrick N, Lewis D and Cross A, 2008. A biomechanical comparison of external skeletal fixation and plating for the stabilization of ilial osteotomies in dogs. *Vet Comp Orthop Traumatol*, 21(4): 349-357, doi: 10.3415/VCOT-06-10-0072

Hamilton MH, Evans DA and Langley-Hobbs SJ, 2009. Feline ilial fractures: assessment of screw loosening and pelvic canal narrowing after lateral plating. *Vet Surg*, 38(3): 326-333, doi: 10.1111/j.1532-950X.2009.00500.x

Jäckle K, Yoshida T, Neigefink K, Meier MP, Seitz MT *et al.*, 2023. Effects of iliosacral joint immobilization on walking after iliosacral screw fixation in humans. *J Clin Med*, 12(20): 6470, doi: 10.3390/jcm12206470

Kenzig AR, Butler JR, Priddy LB, Lacy KR and Elder SH, 2017. A biomechanical comparison of conventional dynamic compression plates and string-of-pearls™ locking plates using cantilever bending in a canine ilial fracture model. *BMC Vet Res*, 13(1): 222, doi: 10.1186/s12917-017-1139-8

Liu J, Lai KA and Chou YL, 1995. Strength of the pin-bone interface of external fixation pins in the iliac crest: A biomechanical study. *Clin Orthop Relat Res*, 310: 237-244

Monfrinotti A, Ambros L, Prados AP, Kreil V and Rebuelto M, 2010. Pharmacokinetics of ceftazidime after intravenous, intramuscular and subcutaneous administration to dogs. *J Vet Pharmacol Ther*, 33(2): 204-207

Montoya L, Ambros L, Kreil V, Bonafine R, Albarellos G *et al.*, 2004. A pharmacokinetic comparison of meloxicam and ketoprofen following oral administration to healthy dogs. *Vet Res Commun*, 28(5): 415-428, doi: 10.1023/B:VERC.0000034995.81994.49