CASE REPORT

Plate Osteosynthesis of Bilateral Ilial Body Fracture using String of Pearls Plate in a Non-Descript Dog

Thavasi Rajendran[1]*, Mohamed Shafiuzama[1], Pushkin Raj Haridoss[2], Sathyamoorthy Ommini Ramamurthy[3]

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[1]Department of Veterinary Surgery and Radiology, Madras Veterinary College, TANUVAS, Chennai-600007, Tamil Nadu, India

[2]Department of Veterinary Surgery and Radiology, Veterinary College and Research Institute, Udumalpet-642205, Tamil Nadu, India

[3]Department of Veterinary Anatomy, Madras Veterinary College, TANUVAS, Chennai-600007, Tamil Nadu, India

Corresponding Author: Dr. Thavasi, R. Post Graduate Student, Department of Veterinary Surgery and Radiology, Madras Veterinary College, TANUVAS, Chennai-600007, Tamil Nadu, India. e-mail: thavasivetsurgeon0312@gmail.com

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The pelvis in dogs is a complex bony structure that serves as the connection between the axial skeleton and the pelvic limbs, forming the foundation for locomotion and support of pelvic organs. The canine pelvis is formed by the bilateral os coxae (hip bones), each comprised of three fused bones: the ilium, ischium, and pubis, which converge at the acetabulum to articulate with the femoral head (Dyce *et al*., 2017). Pelvic fractures in dogs are almost always caused by major trauma such as automobile accidents. Because of the pelvis's box-like configuration, sufficient trauma to cause a fracture typically results in multiple fractures involving the ilium, ischium, and pubis simultaneously. This results in instability, pain and loss of the normal transfer of weight from the affected limb to the spine. The pelvis is surrounded by large muscles that play a crucial role in stabilizing pelvic fractures by providing mechanical support and a rich extraosseous blood supply. This muscular coverage facilitates rapid formation of stabilizing callus and contributes to the high rate of bone union observed following conservative treatment of certain pelvic fractures in dogs (Bush, 2016). Complications associated with conservative management, particularly when pelvic canal narrowing exceeds 45-50%, can result in malunion and marked reduction of the pelvic outlet diameter. These structural alterations may predispose affected dogs and cats to chronic or intermittent constipation and, in advanced cases, the development of megacolon secondary to prolonged faecal retention. Furthermore, severe pelvic canal narrowing can significantly compromise parturition, predisposing female animals to dystocia (Bouabdallah *et al*., 2020).

The weight-bearing axis of the pelvis, primarily involving the ilium and acetabulum, is critical for load transfer during standing and locomotion, and fractures involving this axis may require surgical intervention to restore limb function and pelvic stability (Harasen, 2007). Several fixation techniques have been described for the management of ilium fractures, including the use of lateral plates, reconstruction plates, K-wires, interfragmentary wires, ventral interfragmentary screws, and various combinations of lag screws, pins, orthopaedic wires, and bone plates (Sadan *et al*., 2015). In this case study, the clinical signs, diagnostic findings, and surgical management of an ilial body fracture in a dog are described, with fixation achieved using a String of Pearls (SOP) plate for effective stabilization and anatomical reconstruction.

Case History and Observations

A six-month-old male non-descript dog was presented to the Small Animal Orthopaedic Unit, Madras Veterinary College Teaching Hospital with a history of road traffic accident and inability to bear weight on both hind limbs. On clinical examination, the animal was unable to rise, pain, swelling and palpable crepitus were noted over the pelvic region. Survey radiographs revealed bilateral oblique ilial body fractures with overriding of the pelvic fragments (Fig. 1). Surgical correction was planned.

Treatment and Discussion

The patient was premedicated with butorphanol (0.2 mg/kg, i/v) and diazepam (0.25 mg/kg, i/v). Anaesthetic induction was performed using propofol (2 mg/kg, i/v), and following endotracheal intubation, anaesthesia was maintained with isoflurane in a closed-circuit system with 100% oxygen. The surgical site was aseptically prepared, and the animal was positioned in right lateral recumbency to approach the left ilial body. A skin incision was made over the lateral ilium from the iliac crest to the greater trochanter. The middle gluteal muscle was identified (Fig. 2), and the septum connecting it to the tensor fascia lata muscle was dissected. The middle gluteal muscle was elevated dorsally as needed to expose the ilium. The origin of the deep gluteal muscle was then elevated from the ilial shaft, taking care to preserve the cranial gluteal neurovascular bundle.

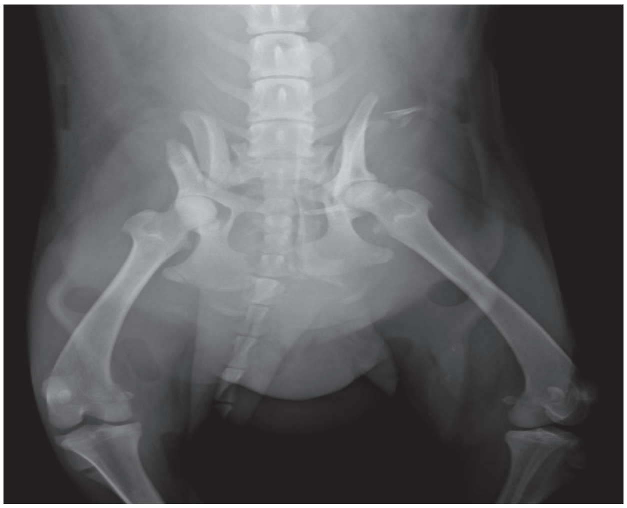

Fig. 1: Bilateral ilial body fracture

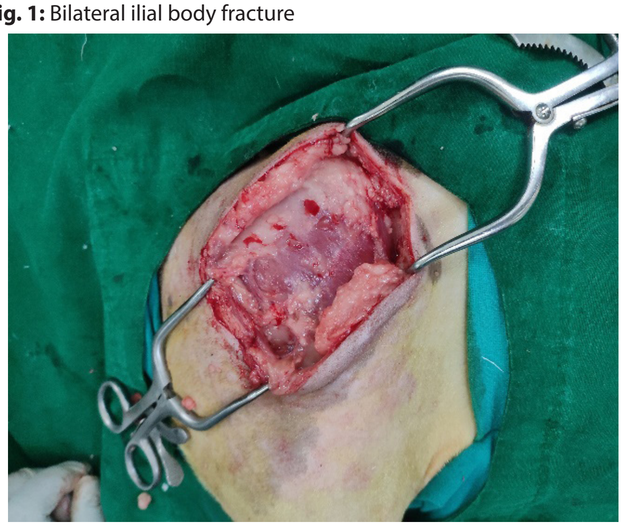

Fig. 2: Exposure of middle gluteal muscle

For additional stabilization, a caudal approach to the ipsilateral ischium was performed. An incision over the ischium allowed blunt dissection of the subdermal fascia and sharp incision of the muscle origins dorsal and ventral to the bone to enable placement of Kern bone-holding forceps. Fracture fragments were identified and reduced, which allowed sufficient lateralization of the caudal fragment to restore the pelvic canal. The fragments were temporarily held in apposition using serrated bone-holding forceps.

A 2.7 mm String of Pearls (SOP) plate was pre-contoured to replicate the anatomical curvature of the ilium. Controlled bending and twisting were performed between the spheroid nodes using SOP plate benders to ensure accurate conformity to the bone surface. The appropriately pre-contoured plate was positioned over the reduced bone. Screw holes were drilled using a 2 mm drill bit and the depth of each hole was measured with a depth gauge. Screws were placed adjacent to the fracture fragments first, followed by placement of the remaining screws in a similar manner (Fig. 3).

The surgical site was thoroughly lavaged with sterile saline to remove debris. The middle gluteal muscle was sutured to the sartorius and tensor fascia lata muscles using absorbable suture material polyglycolic acid No. 2-0. Subcutaneous tissues and skin were closed in layers according to standard surgical procedure. The same surgical procedure was performed on the right ilial body as well (Fig. 4a & 4b). The suture site was cleaned and dressed every third day until suture removal and an Elizabethan collar was applied to prevent self-trauma or self-mutilation.

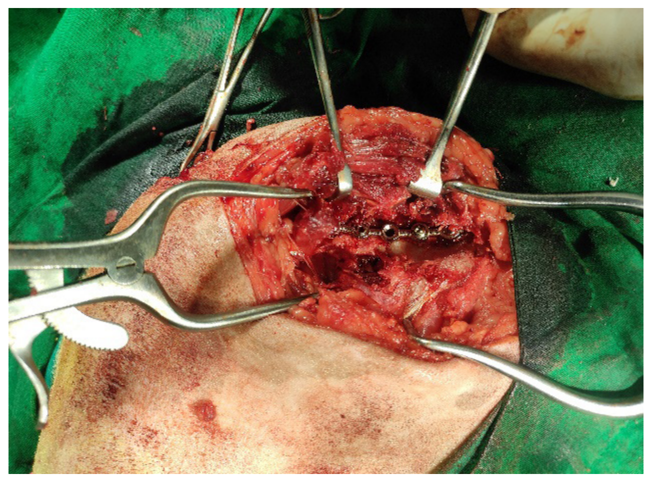

Fig. 3: Reduction and fixation of left ilial body with SOP plate

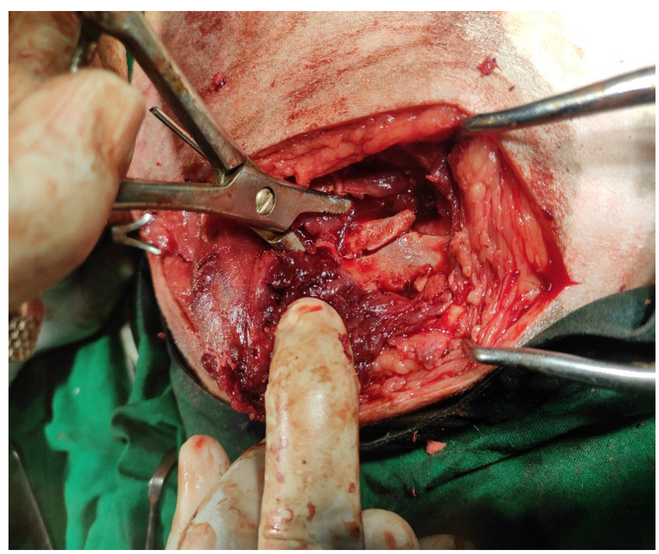

Fig. 4a: Reduction of fracture fragments

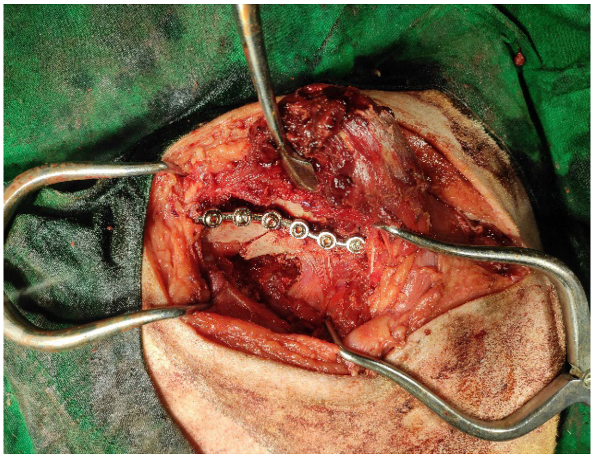

Fig. 4b: Reduction and fixation of right ilial body with SOP plate

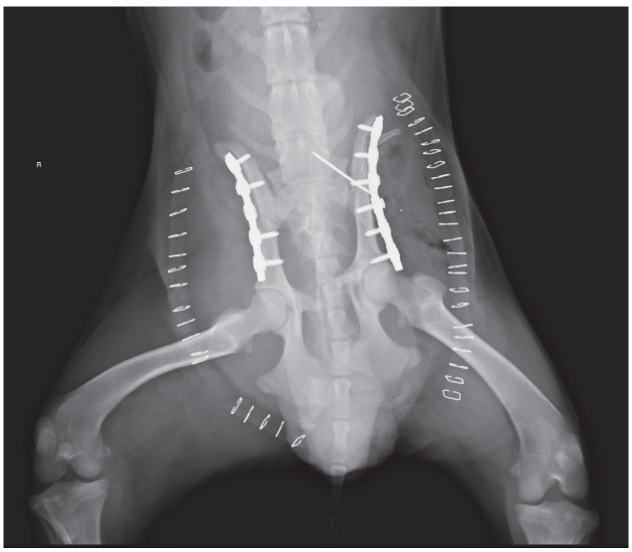

Fig. 5: Post operative radiography – restoration of pelvic canal diameter

Fig. 6: Post operative day 7 – Normal ambulation

Postoperative medications included cefpodoxime proxetil (10 mg/kg, orally, once daily for 7 days) and carprofen (2.2 mg/kg, orally, twice daily for 5 days). The owner was advised to restrict the patient's activity for two weeks, followed by controlled leash walking for an additional two weeks to ensure optimal recovery. Immediate postoperative radiography revealed proper fracture reduction and accurate implant alignment, resulting in the restoration of normal pelvic canal diameter (Fig. 5). Neurological assessment revealed no evidence of sciatic or other neurological deficits, indicating an intact neurological function following surgery. By the third postoperative day, the animal was able to bear weight on the pelvic limbs with progressive clinical improvement. By the seventh postoperative day, the animal exhibited normal ambulation without any signs of lameness (Fig. 6). Postoperative radiographs obtained on day 14 revealed satisfactory fracture fragment alignment, proper implant positioning, and maintained construct stability, with no evidence of implant loosening or failure. Radiographic evaluation at two months post-surgery demonstrated complete osseous union with obliteration of the fracture line. The patient achieved full functional limb recovery without any postoperative complications.

Fracture of any component of canine pelvis can compromise pelvic stability and limb function (Bush, 2016). Pelvic fractures typically occur following high-impact trauma and may involve one or multiple regions of the pelvic girdle. Because the pelvis acts as a ring, isolated fractures are uncommon and are often accompanied by a secondary fracture or sacroiliac separation (Denny and Butterworth, 2000). When pelvic or acetabular fractures are managed conservatively (without surgical intervention), a range of complications and long-term consequences may develop, including gait abnormalities, degenerative joint disease, narrowing of the pelvic canal and in female dogs, constipation or dystocia resulting from a reduced pelvic diameter.

Internal fixation is often required in canine pelvic fractures to restore pelvic alignment, joint congruity, and weight-bearing function, particularly when the acetabulum, ilium, or sacroiliac joint is involved. The most commonly used techniques include plate osteosynthesis, string-of-pearls (SOP) plates, lag screws, cerclage wires, and PMMA composite constructs. The String of Pearls (SOP) plate offers superior contouring versatility, allowing manipulation in six degrees of freedom lateromedially, dorsoventrally, and torsionally without compromising the integrity of the locking interface between the plate and screws (Kraus and Ness, 2007). This characteristic is particularly advantageous in pelvic fracture stabilization, as the pelvic bone exhibits complex three-dimensional curvatures and irregular anatomical surfaces. Straight plates require extensive bending to conform to pelvic anatomy, which can lead to reduced structural strength of the implant and an increased risk of implant breakage. The SOP plate permits up to 20° of torsional adjustment and approximately 40° of bending, providing excellent adaptability to the pelvic bone curvature (Ness, 2009).

Complications commonly encountered with the use of conventional straight plates such as postoperative lameness, reduced range of motion of the coxofemoral joint, implant failure and malunion have not been documented following the application of SOP plates for the stabilization of pelvic fractures in dogs. The ease of contouring and application, combined with the inherent strength of the locking plate design, makes the SOP system an effective and acceptable method for fixation of acetabular fractures as well (Blakely *et al.,* 2019).

Thus, the use of the String of Pearls (SOP) plate for the repair of ilial body fractures can be routinely practised as it offers early functional limb recovery, minimal postoperative complications, excellent anatomical alignment and superior biomechanical stability.

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References

Blakely, J.A., Butler, J.R., Priddy, L.B., McCabe, E.M., Avendaño, J.N., Elder, S.H., & Wills, R. (2019). *Ex vivo* biomechanical comparison of 2.7 mm string-of-pearl plate versus screw/wire/polymethylmethacrylate composite fixation and 2.7 mm veterinary acetabular plate for repair of simulated canine acetabular fractures. *BMC Veterinary Research, 15*(1), 287.

Bouabdallah, R., Meghiref, F., Azzag, N., Benmohand, C., Zenad, W., & Rebouh, M. (2020). Conservative management of pelvic fractures in dogs and cats in Algiers: Incidence and long-term clinical outcomes. *Veterinary World, 13*(11), 2416-2421.

Bush, M. (2016). The pelvis and sacroiliac joint. In: Gemmil, T.J. and Clements, D.N., editors. *Manual of Canine and Feline Fracture Repair and Management*. 2nd edn., BSAVA, Gloucester, United Kingdom, p. 257-261.

Denny, H.R., & Butterworth, S.J. (2000). *A Guide to Canine and Feline Orthopaedic Surgery.* 4th edn., Blackwell Science.

Dyce, K.M., Sack, W.O., & Wensing, C.J. . (2017). *Textbook of Veterinary Anatomy.* B. Singh, Ed., 5th edn., Saunders.

Harasen, G. (2007). Pelvic fractures. *Canadian Veterinary Journal, 48*(11), 1111-1118.

Kraus, K., & Ness, M.G. (2007). *Standard Operating Procedure for SOP Fixation*. 4th edn., Halifax, Orthomed, UK.

Ness, M. (2009). The effect of bending and twisting on the stiffness and strength of the 3.5 SOP implant. *Veterinary Comparative Orthopaedics & Traumatology22,* 132-136.

Sadan, M.A., Fischer, A., Bokemeyer, J., & Kramer, M. (2015). Surgical repair of ilial fractures in dogs and cats using string of pearls (SOP) plate. *Indian Journal of Veterinary Surgery, 36*(1), 41-45.