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Resolución quirúrgica de fractura completa de radio cubito con placa de compresión dinámica (DCP) en un paciente canino criollo de 6 meses: descripción de un caso clínico

Surgical resolution of complete ulna radius fracture with dynamic compression plate (DCP) in a 6-month-old dog patient: description of a clinical case

Lope-Huaman Roberto Javier*, Fernandez-Apaza Javier, Villafuerte-Valverde Susi Ruth

Data of the Article

HOVET Small Animal Hospital.
Private Practice.
Av. Circunvalación A-8
Puerto Maldonado, Tambopata, Madre de Dios, Perú.
Telf: +082-620558.

***Contact address:**
HOVET Small Animal Hospital.
Private Practice.
Av. Circunvalación A-8
Puerto Maldonado, Tambopata, Madre de Dios, Perú.
Telf: +082-620558.

Roberto Javier Lope-Huaman
E-mail address: veterim20@gmail.com

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Resumen

El artículo describe el caso clínico quirúrgico de traumatología de una fractura completa en bisel corto de radio en la diáfisis medial y proximal, y con una fractura completa transversa abierta a nivel de la diáfisis distal de cubito, trauma de alta energía, ocasionada por atropello de motocicleta, en un canino macho criollo de 6 meses de edad con un peso de 5.6 kg quien llego a la consulta a HOVET Hospital de pequeños animales de servicio particular, presentado dolor y claudicación en el miembro anterior derecho y su resolución quirúrgica a través del uso de 2 placas de compresión dinámica (DCP) de 5 orificios y 9 tornillos corticales con la que se obtuvo un pronóstico bueno y mayor estabilidad, y la pronta recuperación de movimientos sin cuadros de infecciones secundarias.

Abstract

The article describes the case clinical trauma surgery of a complete fracture to the short radius bezel of the medial diaphysis and proximal/diaphysis, and with a complete transverse fracture of the distal/diaphysis to the ulna, high energy trauma, of a male canine, 6 months old of age, weighing 5.6 kilograms caused by impact from a motorcycle. The animal arrived at a hospital specializing in small animals and presented with pain and claudication of the right anterior limb. Surgical resolution was achieved with the use of two dynamic compression plates (DCP) 5 holes, and 9 cortical screws. The prognosis for the animal is good, achieving improved stability, prompt recovery of movements and without secondary infections presenting.

Introducción

Statistically, radius fractures are frequent injuries with a bimodal behavior, in juvenile canine patients, the ligaments, tendons are more fragile, adult canines there is greater bone fragility, being the bone that is commonly fractured by traffic accidents, high jumps, and at the same time, the surrounding soft tissue is usually affected, due to its close anatomical relationship[1-3].

Diaphyseal fractures of the radius and ulna occur due to trauma to the forelimb, affecting the diaphysis from the middle to the distal part, the lack of muscle mass in the distal third of the forearm increases the possibility of producing open fractures, This lack of muscle mass causes the healing processes to occur more slowly than usual, accompanied by tissue irritation and hypersensitivity to cold, these fractures are associated with a high proportion of complications and the frequency of delayed unions or non-unions[1,3,4].

There are cases in which the perfect fixation of the radius is not achieved, so it is advisable to fix the ulna to give greater stability to the set, it is always necessary to opt for very stable and appropriate osteosynthesis plate systems. As a general rule, whenever a young animal with a distal forearm fracture is cared for, owners should be advised of the possibility of bone growth disturbances. Fractures between the ages of 4 and 9 months are considered skeletally immature[3,13].

The surgical approaches described are the medial and lateral incision to the radial body, and the dorsal incision to the distal radius and carpus. They vary to the fracture area between the lateral approach and the medial approach, however, if there is a need to reduce and apply fixation to the ulna in support of radial fixation, the lateral approach is appropriate than the medial one. Soft tissue injuries may indicate which side to choose. In distal radial and ulnar osteotomy the lateral approach is easily combined with the lateral ulnar to allow both osteotomies through a single skin incision[5,6].

This article attempts to describe the clinical case of a short radius bevel complete fracture trauma surgery in the medial and proximal diaphysis, and with an open transverse complete fracture at the level of the distal ulnar diaphysis, with the application of the surgical technique approach of the lateral cranial face of the forearm from the lateral epicondyle of the humerus to the ulnar carpus, its surgical resolution through fixation and stabilization with 2 dynamic compression plates (DCP) of length 40 mm, thickness 0.2 mm and width 0.7 mm , with 5 holes with 9 cortical screws of 2.00 * 10 mm and 1 cortical screw of 2.00 * 12 mm is a better option, giving bone consolidation and tissue healing, thus achieving a good result and a speedy recovery of the patient.

Description of the clinical case

Review and anamnesis

Presented for consultation at the Small Animal Hospital, Puerto Maldonado, Madre de Dios, Perú, a creole breed dog, 6 months old, weighing 5.6 kg, with a current vaccination and deworming plan, the patient arrives for consultation after suffering a motorcycle run-over trauma, according to the owner's statement, where in a First impression shows

slight skin lacerations and deep the place of exposure of the fracture in the right forelimb.

General physical exam

Physiological constants, heart rate 138 lpm, respiratory rate 22 rpm, pulse 132 ppm, capillary return time 2 s, temperature 38.8 °C.

Upon examination of the musculoskeletal system, he presented pain in the right forelimb and high-energy trauma, exposed first degree fracture of the distal diaphysis of the ulna with marked claudication in the right forearm[1,7].

Based on the anamnesis and physical examination, the suggested diagnoses were: complete fracture of the diaphysis of the radius and ulna, fracture of the distal epiphysis of the radius, high-energy trauma.

Complementary exams

As diagnostic plans were suggested, hematic picture and blood biochemistry, in the results it is observed that it is within normal parameters (table 1 and 2), and an X-ray in lateral position and ventral dorsum of the forearm to observe the radius and the distal part of the ulna, the radiographic images indicate that it is a complete short-radius bevel fracture in the medial diaphysis and a complete transverse ulnar fracture at the distal diaphysis level is observed in the (figure 1 and 2), the radiological images of the described fracture, according to the AO classification (Association for the Study of Osteosynthesis) is type 22-A3.

Pre-surgical planning is essential because it allows us to opt for the approach technique with the greatest favorable result where tissue preserves, together with the trauma surgical instruments used during the intervention and the type of internal fixation osteosynthesis (DCP implants), which will give greater stability, facilitate a good anatomical reduction, and contact between fragments and a short time recovery. Accompanied by the pre-operative protocol of analgesia and anesthesia during orthopedic surgery, and the follow-up together with the post-surgical control radiographic plates.

Table 1 Hematological parameters

Parameters	Result	Units	Reference Value
Erythrocyte	5.840000	Eri/uL	5.300000-8.810000
Hematocrit	39.9	%	39.2-58.8
Hemoglobin	13.3	g/dL	12.7-16.3
Leukocytes	12.500	Leu/uL	6000-15000
Neutrophils	66	%	55-75
Eosinophils	7.5	%	1-10
Lymphocytes	14	%	12-30
Platelets	240000	Plt/uL	160000-461000

Tabla 2 Química sanguínea

Parameters	Result	Units	Reference Value
Creatinine	0.8	mg/dL	0.5-1.5
Urea	36	mg/dL	20-40
Bilirubin	0.5	mg/dL	0.1-0.61

Surgical treatment approach

In the pre-surgical period, the patient was infused via IV sodium chloride solution 0.9% 5 mL / kg IV and Ringer lactate 40 mL / kg IV for better homeostasis of liquids and electrolytes, ketoprofen 2 mg / kg IV, every 24 h, tramadol 2 mg / kg IV every 8 h for pain management, Cephalexin 20 mg / kg IM, every 12 h to avoid secondary infections, surgical planning and the choice of the implant size to be used[1,8,9].

Figure 1 Radiography lateral view of the radius ulna from the right side

Figure 2 X-ray view of the dorsal ventral radius ulna on the right side

Orthopedic resolution

The patient is prepared for an orthopedic surgical intervention, with prior trichotomy and rigorous antisepsis, lavage with chlorhexidine 2% topically in the incision area, anesthesia and surgical management, such as pre-medication, midazolam 0.1 mg / kg IV, analgesic, fentanyl 0.02 mg / kg IV, ketamine 6.6 mg / kg IV, and maintenance, Propofol 0.4mg / kg / min (40 min) continuous infusion in dextrose 5% IV, total intravenous anesthesia (TIVA) [1,8-10].

1. The approach begins with an incision in the skin on the lateral skull of the forearm from the lateral epicondyle of the humerus to the ulnar carpus.

Figure 3 Approach to the diaphysis of the radius by lateral incision

2. After dissecting the fascia of the forearm, the extensor carpi radialis and common digital extensor muscles were identified. With the help of the Weitlaner retractor, the muscles were retracted laterally[5].
3. The body of the radius is exposed and the abductor longus muscle of the first finger, it was separated for greater exposure of the distal part of the radius, it was displaced caudally[4, 9].
4. It was necessary to expose the fracture well to reconstruct the fracture and obtain a good bone consolidation and place the plate, using the Gelpi retractor to visualize well.
5. The fracture was aligned and stabilized for the application of a dynamic compression plate

(DCP), for this the plate of length 40 mm, thickness 0.2 mm and width 0.7 mm was molded to the morphology of the bone, then the plate was fixed in the Diaphysis of the fractured bone with the help of the verbrugge reducing forceps, and with the use of an orthopedic drill placed with the 1.2 mm drill bit and the 2.0 mm guide on the DCP plate in the stabilized bone, the holes are made to apply them cortical screws 2.00 * 10 mm.

Figure 4 Fracture location and distal enlargement of the radius

6. The procedure was also performed in the ulna fracture, and the application of a compression cortical screw of 2.00 * 12 mm in the proximal radius fracture in order to share load. At the end of osteosynthesis. The muscles and fascia were closed with 3-0/30 polyglycolic acid absorbable thread and the skin with 0.35 mm monofilament nylon.

Postoperative management

In the postoperative period, disinfection and topical washing with chlorhexidine 2%, Ketoprofen 2 mg / kg IV, every 24 h, tramadol 2 mg / kg IV every 8 h for postoperative pain management, Cephalexin 20 mg / kg IM, every 12 h for 3 days, a continuous and strict follow-up allowed to identify and treat as soon as possible the presence of complications together with the determining factors of the animal's character and the collaboration of the owner to avoid secondary infections, five days after surgery he began to use the forearm although always with little confidence, 35 days after surgical evaluation it was evidenced that he maintains almost all of the movement of the forearm.

Figure 5 Application of DCP osteosynthesis plates of length 40mm, height 0.2mm and width 0.7mm and conventional cortical screws of 2.00 * 10mm and 1 cortical screw of 2.00 * 12mm

Results

The patient arrived at HOVET Small Animal Hospital with a marked claudication in the right forelimb, with deficit of use of the forearm and pain on ma-

nipulation due to a run over by a motorcycle, the diagnostic imaging a lateral and dorsal view x-ray of the forearm was significant in the resolution of the present case, and the surgical resolution of the use of 2 dynamic compression plates (DCP) and 9 cortical screws, compared to a first degree open fracture of the ulna, and the complete fracture of the radius at the distal level and proximal, no intra-surgical complications were reported in the procedure, it is important to consider that this type of fracture is rare and a prompt resolution gives positive responses in the patient's recovery.

Figura 6 Radiografía vista latero lateral, post quirúrgico

Discussion

Traumatic fractures of the radius and ulna are common in dogs and cats, so an orthopedic surgical treatment is required with a favorable result, which is why the application of dynamic compression plates (DCP) was chosen in this clinical case. , including the type of lateral approach and the fracture reduction technique described by[3,11,12].

According to the results, a poor union after a radius fixation is only a common complication, especially when it comes to a distal radius and ulnar fracture, which can hinder the movement of the forearm and can contribute to post-traumatic arthritis, and a carpal instability misalignment[1,11].

Figura 7 Radiografía vista dorso ventral, post quirúrgico

Although, there are authors who emphasize the preservation of the soft tissue envelope that surrounds the radius ulna fracture site, in order to optimize the bone healing capacity in a short time. Because there is a negativo impact on periosteal vascularization, and it can further deplete the viability of the periosteum[4,12].

The orthopedic surgical technique proposed in this article is mentioned due to the complexity of the fracture itself, which compromises the radius with a distal and proximal fracture and a complete fracture in the ulna requires the need to reduce and apply fixation to the ulna to support fixation Radial, accompanied by a first degree open fracture in the ulna, gives us the safest option for fixing both fractures for greater stability, greater bone consolidation and safety with the use of 2 dynamic compression plates (DCP). Which at a postoperative evaluation after five days shows a favorable recovery due to the use of the forearm[3,5,6].

The surgical technique provides greater security as the results evidenced in the bilateral approach and stabilization with LCP locking compression plates in a hybrid construction that leads to a high percentage of acceptable to excellent results with a low rate of complications in both dogs. adults and youth[13]. Additional studies are recommended to clarify the associations between various cases and relate to the procedure and exposure of the complexities that may arise.

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Conflictos de intereses

The participants in this clinical case report called "Surgical resolution of a complete fracture of the radius ulnar with a dynamic compression plate (DCP) in a 6-month-old canine Creole patient: description of a clinical case" declare that there is no problem in the relationship with the information disclosed here with the participating institutions.

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Ethical aspects

During the execution of this investigation case report, no faults were incurred. In the intervention we have taken into account human sensitivity without realizing discomfort, anguish and the pain of the animals, for this, the use of the appropriate anesthesia and analgesia protocol was taken within an operating room.

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