DOI 10.7251/VETJEN2001190P **UDK 636.7: 616.728.4/.5-001.5-08**

Case raport

TREATMENT OF HOCK JOINT FRACTURES IN A DOG - CASE RAPORT

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Abstract
The techniques of stabilizing the fracture of the hock joint fractures in a dog are developed in order to ensure the reposition and stabilization of the limbs. In our case, after a clinical examination, RTG analysis of the broken joint and assessment of the general condition of the dog, a surgical procedure was selected. In the dissociative anesthesia, with minimal tissue damage, the reposition of dislocated joint surfaces was made. The traumatized joint was reponated and fixed with cortical screws interconnected by cerclage wire. Screws provide the required stability of the talotibial joint surfaces. In the postoperative period, analgesic and antibiotic therapy was used, and fixation of the treated fracture of the hock joint was done. Also, recommendations and advice for postoperative treatment of a dog in home conditions were given to the owner. After forty days a surgery was performed in order to extract the cortical screws and cerclage wires, according to the standard procedure. In our case, after a complete and successful repair of the fracture, the dog recovered after two months and did not have symptoms of lameness. The results of successful surgical treatment were the reason to show this case as study report, in order to provide an alternative solution or advice to colleagues who could encounter similar fracture in small animal practice.
Keywords: hock joint, dog, surgical procedure, reposition

INTRODUCTION

Dog`s hock joint anatomical feature is that it consists of the seven tarsal bones. The hock joint connects the bones of the lower thigh with the bones of the paw (figure 1.). The articular surface of the talus is well developed, its ridges are not very high, and it is slightly concave on lateral side and proximally articulate with a fibula. Calcaneus is located next to, with a well defined *tuber calcanei*, which is divided in dogs, by the sagital groove, into lateral and medial part (Janković, 1988). In the middle row on the medial side is the *os tarsi centrale* and below are located the first, second, third and fourth tarsal bones *os tarsi primum, secundum, tertium and quartum* arranged from the medial to the lateral side of the

joint (figure 2.). It is important to emphasise that *tuber calcanei* merges with the body of the calcaneus at the age of 14 to 15 months (Matis, 2007). Laterally and medially, there are ligaments that provide joint stability. The joint capsule fits into the natural angle of the hock joint to prevent its damage.

Bones fractures or ruptures of the ligaments of the hock occur due to the action of the force that traumatizes the tissues at a certain angle. Thus, the soft tissues are damaged and the continuity of the bone tissue is interrupted. A fracture of this joint can lead to injury of any of the four main ligaments located inside and outside of the joint (Gayle, 2005). Symptoms of hock joint damage in dogs include pain, swelling, redness, heating at the site of injury, and instability in movement i.e. lameness. At the beginning of treatment, this injury should be distinguished from injury and damage of the Achilles tendon or ligaments of the hock joint (Cook, 2003). Also, it should be sure that dog does not limp due to abnormal development or damage to the cartilage. For these reasons, it is best to obtain an X-ray of the leg, in order to get an accurate diagnosis as quickly as possible (O'Donoghue, 2001). An injured hock joint necessary leads to a greater or lesser contraction of the muscle around it.

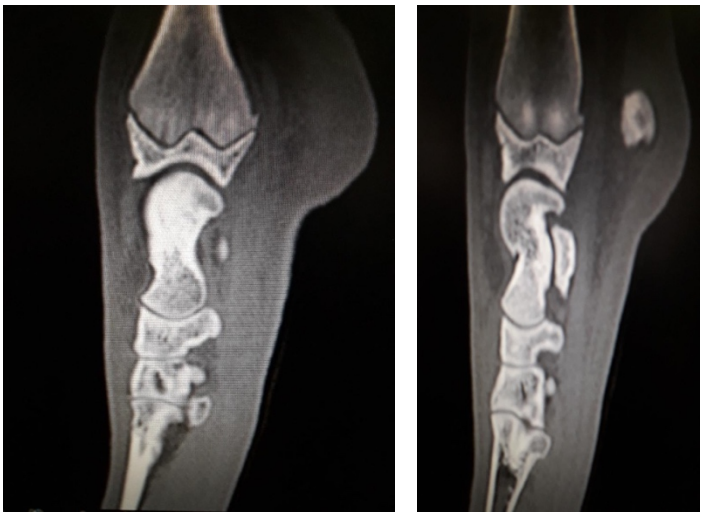

Figure 1. CT scans of a dog`s healthy hock joint (2)

Figure 2. Anatomical view of a dog`s hock joint (2)

Invasive surgery is a potential treatment that veterinarians use in practice to repair an hock joint fracture in dogs. When the surgery is not the best option, conservative treatment options for hock joint sprains and strains may include medications that help with swelling, due to soft tissue injuries, which can lead to bruising, and ortopedic strain. More and more pet owners do not realize how their dog got injured, although the most common injuries occur in car accidents, after a dog is hit by a car, injury, falling of a dog from a height or trapping of a leg in narrow sharp objects (Gelberman, 1999). Surgery of joint injury is quite rare, but if it happens, with proper treatment, the fully recovered dog can return to normal life easier and faster (Spiros, 2000).

MATERIALS AND METHODS

A 6 months old Husky dog with an SL fracture of the right limb hock joint with exact cause unknown was chosen for our study. Clinical examination revealed that the patient`s health condition was satisfactory. The animal was conscious, oriented, and hemodynamically stable. After the initial diagnosis, an X-ray was taken. Images of the diseased leg were made in the regio tarsi in two projections (figure 3.). The images show fracture of the tibia in the area of distal physis. The use of X-rays is mandatory in providing the final diagnosis from at least two projections. It gives us an insight into the condition of bone structure, where in case of fracture, the following may be present: dislocation of joint surfaces, fissures, fragments, etc. Exact insight into the condition of bone elements of the joint determines the choice of technique and the type of material for repositioning or possible osteosynthesis.

By the palpation of the injured joint of the dog, we found that it was painful to the touch, warm and swollen, and in the condition that keeps foot in the air, meaning that the fourth degree of lameness was expressed. Soft tissue edema was also pronounced, so, besides a detailed clinical examination during preparation of the patient, we applied painkillers and drugs to reduce swelling. The dog was in good physical condition, hematological and biochemical parameters were within physiological range. Physiological heart tones and respiration were heard during auscultation of dog`s heart and lungs.

Figure 3. X-ray of dog`s hock joint fracture from our study (photo: DVM Goran Paraš)

Proper time for surgery and the adequate choice of anesthesia was estimated based on a detailed clinical examination and laboratory blood tests. CBC was performed on a VetScil device, Canada, as well as a blood biochemical analysis on a Roche device, Switzerland.

After preoperative preparation, fasting for 8 hours and water deprivation for 4 hours before surgery, we decided to use dissociative anesthetics and applied: xylazine (Interchemie) at a dose of 10 mg/kg of body weight (BW) of animal and atropine (Leiras) 1% at a dose of 30 -100 mg/kg of body weight of animal s.c. Ketamine (i.v) was also applied at a dose of 10 mg/kg together with diazepam 0,25 mg/kg until satisfactory anesthesia, in a venous cannula through which saline solution was infused.

Anesthesiology procedures

Premedication: atropine 30-100 mg/kg s.c.(1%/ 0.4 mL/10 kg BW)

Sedation: sedative hypnotic α-2 agonist, xylazine 1mg/kg/BW/i.v.

Analgesia: carprofen (Rimadil) 3 mg/BW/i.v. preoperatively

Induction: i.v.aplication 10% ketamine hydrochloride at a dose of 15 mg/kg/BM, 0.5 mL+ 0.5 mL with 5 mg diazepam (0.25 mg/kg/BW) in the same syringe (diazepam is mandatory

because it suppresses the side effects of ketamine, and also has muscle relaxant effect).

Patient positioning: the dog was placed on the left side with the i.v. catheter in *v. cephalica antebrachi,* through which adequate depth of surgical anesthesia was maintained – degree III/2. The operating field was prepared by shearing and disinfection with 5% chlorhexidine and a sterile compress was applied.

Monitoring: basic in which we monitored respiration and heart rate.

The technique of surgical repair of a hock joint fracture

Access to tarsal joint was from the lateral side, taking care to preserve the vital parts of the tissue as much as possible. By careful dissecting of the end parts of the muscles and tendons, the corresponding bone structures were repositioned and two cortical screws were placed, which were connected to each other with a cerclage wire to stabilaze the joint (figure 4.). As in this case there was a dislocation between the distal part of the tibia and fibula (ossa cruris) which articulate with the proximal part of the tarsal joint by talus and calcaneus, one screw was placed in the tibia (figure 4.), and the other in the talus (figure 5.) so that the cerclage of the wires stabilizes the joint surfaces and prevents re-dislocation of these joint surfaces. The joint capsule was sutured with a single knotted suture, and the choice of material was PGA-polyglycolic acid 2-0. The skin was sutured with a single return suture with PGA-polyglycolic acid 3-0 thick.

Figure 4. X-ray image of the stabilazed hock joint in the AP projection, just before the removal of the osteosynthetic material (photo: DVM Goran Paraš)

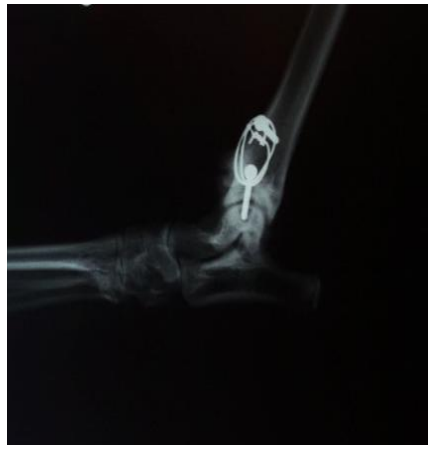

Figure 5. X-ray image of the stabilazed hock joint in the LL projection, just before the removal of the osteosynthetic material (photo: DVM Goran Paraš)

Postoperative pain therapy: carprofen (Rimadil) 3 mg/kg/BW i.v. 3-6 days. Antibiotic treatment lasted 7 days, and we used cefquin 12.5 mg /10 kg BW. We used vitamin AD 80 000 IU/10 kg BW, vitamin C 300 mg and B complex vitamin 1 mg/ml/BM, as supportive therapy. As a recommendation for the continuation of therapy at home, we gave a mineral – vitamin prepartion with glucosamine and chondroitin sulfate in the prescribed dose. A steril swab was placed on the outside of the surgical inclision, and a bandage and elastic bandage were placed over it.

Surgical technique for removal of osteosynthesis material

After forty days of postoperative recovery, the dog underwent surgery in which we removed the osteosynthesis material. The preparation of the patient for the surgery was the same as in the first operation. The anesthesia procedure was performed with the same choice of anesthesia in a adjust period of time.

RESULTS AND DISSCUSION

After the performed surgical intervention, reposition and satbilization of the joint with selected osteosynthetic material, surgical wound was regulary bandaged and controlled. For the next 10 days, the dog spread the diseased limb, with occasional reliance. On the tenth day we removed the sutures from the skin, and on the fortieth day we removed the osteosyntesis material. During the wound control and bandaging in the post-operative period, we also monitored the movement of the animal and the function of the limb was returned to the physiological state. Also, there was no the slightest degree of lameness expressed. All types of fractures are very uncomfortable, because intense pain occurs, and the animal has difficulty to move and therefore use compensatory mechanism for surviving (Hudson, 2010). With timely intervention and a good assessment of the condition, we can determine how to help the injured animal. In our case, the repair of hock joint fracture in a young dog prevented its permanent limb damage. The use of cerclage wire in connecting screws is very important because it completely prevents the movement of bone structures that were in dislocation. The choice of technique in our study proved to be very effective because we achieved desired result, meaning that the dog walked normally, grew and developed. In addition to the method used in our study, there is another more applied method for repairing hock joint fractures in dogs, called X-pin method. In this method, a pin is placed crosswise for tibiotalus fixation of the joint. Authors of presented case study did not apply this method for treatment of hock joint fractures due to specificity of the fracture and in order to avoid major damage of the joint surface. They were convinced that the method they chose and applied with the help of two screws and one cerclage wire, caused less damaged to the articular surfaces of the hock joint bones. Both methods have risks of failure because they can lead to ankylosis of the joint, increased pressure on the physique, as well as development of deformities in the dog`s bone growth. However, none of the mentioned risks occurred in our case, where the repair of the dog`s hock joint fracture was successfully achieved, because after removing the osteosyntetic material, the dog

walked without limping and changed the walking pattern, as dog still walks today.

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Paper received: 08.12.2019.
Paper accepted: 07.07.2020.