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INTRA-ARTICULAR REPLACEMENT OF THE CAUDAL CRUCIATE LIGAMENT USING A UHMWPE LIGAMENT UNDER ARTHROSCOPIC GUIDANCE IN A DOG: A CASE REPORT

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Introduction

Rupture of the caudal cruciate ligament (CdCL) is an uncommon cause of lameness in dogs, characterized by a caudal drawer motion, thickening of the stifle and painful mobilization of the joint, especially in hyperextension1,2. Since this condition is rather rare, the literature only reports few surgical techniques that specifically treat isolated CdCL rupture. The need of caudal cruciate repair is also questioned as dogs can heal without surgical management. Passive stabilization of a cruciate ligament rupture can be done with either an extra-articular or an intra-articular technique. The objective of this case report is to describe the arthroscopically assisted reconstruction of the CdCL using a UHMWPE implant and the outcome over a 12-months period.

Description of the case

A 2-year-old female Sheperd mixed-breed weighing 15 kg, who suffered from a trauma during a play phase three months ago, was presented with chronique severe lameness on the right hindlimb nonresponsive to NSAIDs. The orthopedic examination revealed a positive caudal drawer test. The stress radiographs confirmed the suspicion of CdCL rupture with obvious caudal displacement of the tibia relative to the femur. A LOAD questionnaire was completed with the owner of the animal during the preoperative consultation, with a score of 22/52 indicating severe mobility impairment.3 The CdCL was replaced using a synthetic ligament made of UHMWPE using an arthroscopic approach.

Surgical technique

The dog was placed in dorsal recumbency. The patient was prepared for aseptic surgery on the right hindlimb using chlorhexidine. A joint distractor supported by two 2.5-mm pins was placed on the stifle.

The arthroscopic port was placed on the lateral side through a 5-mm lateral parapatellar incision done with an #11 blade. Arthroscopic evaluation of the joint revealed inflammation of the medial meniscus without structural damage and confirmed the complete rupture of the CdCL in its distal part, by the tibial insertion. The lateral meniscus and the CCL were intact.

The lateral parapatellar incision was made 3 cm wider to allow the complete resection of the damaged CdCL with a 11-mm blade under arthroscopic control. The bone tunnels for femoral and tibial fixation of the synthetic ligament were done under arthroscopic control. A 2-mm guide wire was inserted at the femoral footprint of the origin of the CdCL in a caudo-medial direction to exit on the medial side of the femoral condyle under arthroscopic guidance. The femoral tunnel was drilled over the guide wire using a 3.6-mm cannulated drill bit. The placement of the tibial tunnel was done with the help of a tibial drilling guide. The orientation of the tibial tunnel was from the footprint of the insertion of the CdCL on the proximal tibia in a distal and cranio-lateral direction. A stab incision was made at caudal aspect of the joint to insert the tip of the tibial drilling guide, it was positioned at the tibial insertion of the CdCL under arthroscopic control. A stab-incision was made on the proximal aspect of the craniolateral aspect of the tibia to position the sleeve of the drilling guide. The appropriate position of the tip of the tibial drilling guide was assessed arthroscopically before drilling. The same technique used for the femoral tunnel was done to drill the tibial tunnel. The UHMWPE implant (Novalig 4000, Novetech Surgery, Monaco) was passed through the tibial and femoral tunnels using a passing tube and a wire loop. A 4.5mmx20mm interference screw was placed from inside-out4. Manual

tensioning of the ligament on the tibial side was then applied maintained with a Kocher clamp. Once satisfactory tension was achieved, the implant was locked with a second 4.5x20-mm interference screw placed from outside-in4. Once the implant was securely locked, no residual drawer sign and normal range of motion were reported. Postoperative radiographs showed a satisfactory position of the tunnels and a good implantation of the interference screws along the axis of the drillings.

Postoperative management
Immediate postoperative follow-up
The patient was placed on full rest for 8 weeks, with short lead walks only. Pain management was perfomed with NSAIDs (Meloxicam (0.05 mg / kg)) for six days, and painkiller (fentanyl patch (12 µg / h)) for 72h. Art day 1, the dog was walking on her operated leg with moderate lameness.

Mid-to long-term follow-up (15-day; 30-day; two-month; three-month; six-month; one-year)
Follow up consisted of full orthopedic examination, orthogonal radiographs of the stifle and LOAD questionnaire. During each postoperative consultation, two x-rays were performed (face and profile), an Orthopedic examination and filling a LOAD questionnaire.
- Orthopedic examination: moderate lameness was observed from 15-days to two-months post op, mild lameness at 3 months and very mild at 6 month and no more lameness at one year post surgery. A mild posterior drawer was reported during the three-month consultation evolving to a moderate grade at six months postoperative without any other degradation at one-year postoperative.
- Radiographs showed thinckening of the patellar tendon for the first two months. Moderate synovial inflammation was reported from one to six months post op and was resolved at the one year follow up.
- LOAD questionnaires: 15-day: 21/52; 30-day: 13/52; two-month: 7/52; three-month: 7/52; six-month: 5/52; one-year: 2/52.

Conclusions
In view of the clinical and radiographic outcomes of this case over 12 postoperative months, we may conclude that this technique of intra-articular reconstruction of the CCL gives satisfactory results. There is no real consensus in the literature regarding the surgical treatment of isolated CCL rupture. The choice of this synthetic reconstruction technique was based on the satisfactory biomechanical results published on the interference screw fixation system of this UHMWPE4 implant, combined with the encouraging clinical results of this device used in tendon reconstructions5. Arthroscopy-assisted surgery also helped reduce potential damage to the surgical site, with the aim of minimizing perioperative trauma for the patient and optimizing its chances of early recovery. This goal was achieved with a return to weight-bearing on D+1. However, using an intra-articular synthetic implant in contact with the CCL is not without risks. In this clinical case, a synovial inflammation did remain present during 6-month after the surgery in conjunction with a mild lameness during. Nevertheless, clinically the dog recovered fully and was back on a normal level of activity after 6 months. The LOAD results at 6 months and 1 year were excellent.
In light of the scarcity of clinical cases presenting this condition and the limited number of surgical techniques published in the scientific literature, we believe that this technique could be considered as a possible treatment method for isolated rupture of the CCL in dogs and could also be considered in multiple ligament-injured stifles in dogs.

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