

Arthroscopic Removal of Large Cartilage Fragment in a Dog with Osteochondritis Dissecans of Shoulder Joint

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Abstract : An 11-month-old, 19.5 kg, intact male Border collie was referred with intermittent left forelimb lameness to the Gyeongsang Animal Medical Center. The symptom was first discovered about 6 months ago, and it has gotten worse for the last 10 days with non-weight bearing on the left forelimb. During the physical examination, the patient showed painful reaction when the left shoulder was abducted. On radiographic assessment, a radiolucent line and some osteophytes were found in both humeral heads. Based on patient's clinical signs and radiographic findings, osteochondritis dissecans (OCD) was very suspicious. So, we decided to perform an arthroscopic surgery on left shoulder for definitive diagnosis and treatment because the right forelimb revealed no clinical signs. During arthroscopic technique, we found a large OCD flap on the caudo-central area of humeral head, and observed severe synovitis over a wide range on posterior area of the articular capsule. The large OCD flap was removed by a grasping forceps, and many joint mice were removed either. Curettage was performed using a curette on the articular surface until hemorrhage occurred, and articular capsule flushed with a lactated-ringer's solution. The patient was discharged on the same day without any specific abnormal status. Antibiotic, anti-inflammatory and analgesic drugs were administered. Mild lameness on left forelimb was observed in 2 weeks after surgery, but after 4 weeks, the patient showed complete normal gait without any lameness. Although surgical removal of OCD flap with arthroscopic was previously reported, We would like note that a large OCD flap can also be removed by arthroscopic surgery in this report.

Key words : dog, arthroscopy, osteochondritis dissecans, OCD, large cartilage fragment.

Introduction

An abnormal development of the glenoid or humeral head causes shoulder problems (8). Osteochondrosis (OC) is a common joint disorder that has been reported in various species, especially in human beings, pigs, horses and dogs (3). When a piece of the articular cartilage tears away from the epiphysis and forms a flap, that status is called osteochondritis dissecans (OCD) (7). OCD is the most common developmental shoulder problem, and it usually occurs in the caudal aspect of the humeral head (8). It can also occur in hock, stifle, and elbow (7). We would like to modify the terms to include the modifiers dissecans for cleft formation through articular cartilage as did Ytrehus *et al* (14).

The etiology of this disease is attributable to both genetic and environmental factors (6). There are various causes, including rapid growth, heredity, anatomic characteristics, trauma, dietary factors, and a defect in vascular supply to epiphyseal cartilage (14) OCD is discovered in growing dogs of medium- or large-sized breeds, and males are affected

more often than females (8) (14) (9). Not all big breeds are susceptible to OCD, is less likely to influence Doberman Pinschers, Collies, and Siberian Huskies. The symptoms of OCD are commonly found in a dog from 4 months to 18 months (7).

The most prominent clinical sign in OCD is lameness on one or both forelimbs, especially worsens after exercise. The other important clinical sign is stiffness after periods of rest. Palpation, hyperflexion or hyperextension of the shoulder joint give the patient severe pain (9). If a patient shows lameness and feels pain on shoulder manipulation, there is a high probability that clinically important lesion may be present (4).

Radiography, magnetic resonance imaging (MRI), and ultrasonography are commonly used for diagnosis of shoulder OC and OCD in dogs (13). Mineralized flap is usually visible on radiographs, so the definitive diagnosis of OCD could be made by radiology (9). For identifying OC/OCD lesions, radiography has the highest specificity, the lowest sensitivity and positive likelihood ratio result that compared to the other imaging techniques. A flattened or irregular margin of the caudal humeral head is the disrupted endochondral ossification process (13). There may also be joint effusion, mineralized flaps and fragments, gas and secondary degenerative changes (5).

Although surgical removal of OCD flap using arthrotomy

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or arthroscopy is a general treatment for shoulder, a few veterinarians have preferred conservative treatment (10). Restriction of physical movements to leash walk and trot, cold therapy, and passive range of motion (PROM) exercises are among the conservative management of OCD that can be used (8). When a mineralized joint mouse is identified, surgery should be indicated to prevent secondary degenerative joint disease. Surgery for treatment of OCD is made up of removing the piece of cartilage or cartilage flap in the defect and trimming the edges of the site (9). Pain control, cold therapy, PROM exercises, and short controlled leash walks are applied to the postoperative OCD patient (8).

Case

An 11-month-old, 19.5 kg, intact male Border collie was admitted with intermittent left forelimb lameness of 6 months duration (Fig 1). The lameness was getting worse with non-weight bearing in last 10 days. Severe stiffness of left forelimb was revealed after a long-time rest. In relation to the lameness, no history existed. During the physical examination, the patient had a pain on palpation and abduction at left shoulder joint. In radiological diagnosis, some osteophytes were found in both humeral heads, and also a radiolucent line existed (Fig 2). In complete blood count and serum chemistry assessment, there was no meaningful data of lameness. We suspected OCD on left shoulder joint based on patient's clinical signs and the results of several assessments, especially radiography. So, we decided to perform an arthroscopic surgery on left shoulder for definitive diagnosis and treatment because the right forelimb revealed no clinical signs.

The patient was applied 12 hours fasting, and then 25 mg/kg cefazolin (Cefazolin, Chongkundang Pharm., Korea), 0.2 mg/kg meloxicam (Metacam, Boeringer Ingelheim, USA) and 0.4 mg/kg butorphanol (Butophan, Myungmoon Pharm., Korea) were administered intravenously before surgery. By using 6 mg/kg propofol (Provive, Myungmoon Pharm., Korea), general anesthesia induction was executed and it was maintained with isoflurane (Ifran, Hana Pharm., Korea) via endotracheal tube intubation.

The patient was positioned left lateral recumbency on an operating table and a lateral approach method was applied as described in van Ryssen B *et al.* (12).

Egress, camera and instrument insertion for arthroscopic diagnosis and treatment has been made in accordance with Person MW *et al.* (11). In brief, an egress needle was inserted into the location near the ridge of greater tubercle and arthroscopic portal was installed on the distal region of acromial process of scapula. Finally, an instrument port was equipped with 2 mm away from the caudal edge of acromium.

In arthroscopic view, severe synovitis was observed over a wide range on posterior area of the articular capsule (Fig 3) and a large OCD flap was found on the caudo-central area of humeral head (Fig 4A). The large OCD flap was removed by a grasping forceps (Fig 4B), and many joint mice were removed either. Curettage was performed using a curette on the articular surface until hemorrhage occurred (Fig 5), and articular capsule flushed with a lactated-ringer's solution.



Fig 1. An 11-month-old, 19.5 kg, intact male Border collie was admitted. He had lameness on left forelimb.

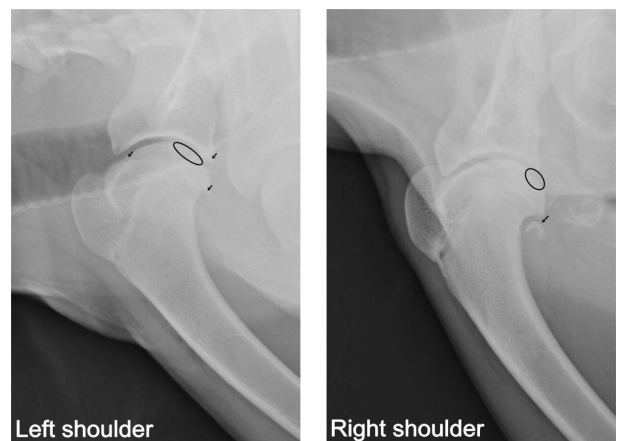


Fig 2. Radiography on both shoulder joints. In left shoulder, a radiolucent line (circle) existed and also some osteophytes (arrows) existed. In right shoulder, subchondral bone defect (circle) was identified and also mineral opacity substance (arrow) was discovered.

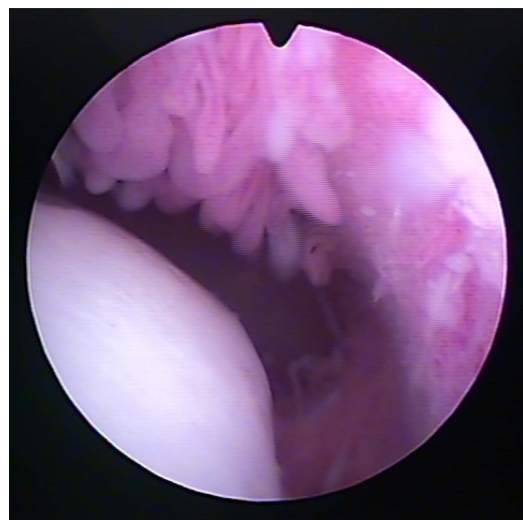


Fig 3. Arthroscopic image in caudal aspect of the humeral head. Severe degenerative change was observed on synovial membrane.

Incisional skin sites were closed with a non-absorbable suture material (3-0 Nylon) by simple interrupted suture

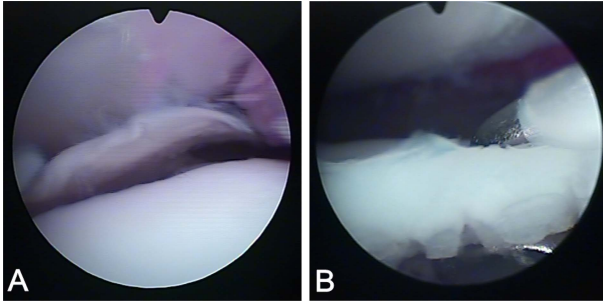


Fig 4. A large OCD flap was discovered on the caudo-central area of the articular capsule (A). The flap was removed by a grasping forceps (B).

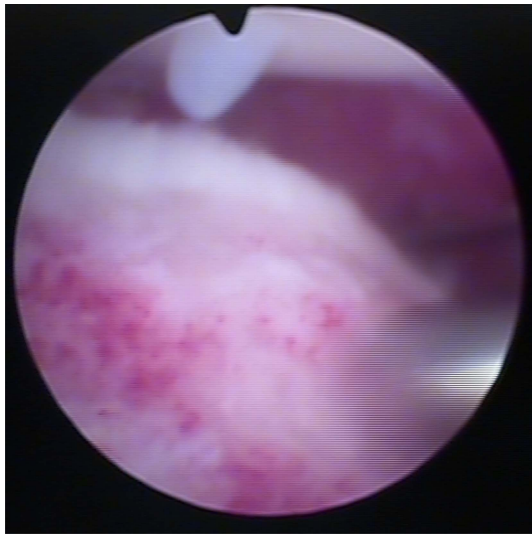


Fig 5. Curettage was performed until hemorrhage occurred.



Fig 6. The removed OCD flap. Its length was about 19 mm.

method. The length of removed OCD flap was about 19 mm (Fig 6).

After surgery, the patient recovered uneventfully from general anesthesia, and he was discharged in the same day with antibiotic, anti-inflammatory and analgesic medications. The

initial medications were composed of 30 mg/kg cefadroxil (Cefacil, Hankook Korus Pharm., Korea) twice a day for 10 days, 0.1 mg/kg meloxicam (Metacam, Boeringer Ingelheim, USA) once a day for 10 days and 2 mg/kg tramadol (Tridol, Yuhan-YangHang, Korea) twice a day for 3 days. Even though the initial medications were completely applied for the patient, mild lameness still remained. So, the patient was administered prednisolone (Solondo, Yuhan-YangHang, Korea) at a dosage of 0.5 mg/kg once a day for 7 days additionally. In 4 weeks after surgery, the patient showed complete normal gait without any lameness.

Discussion

In this case, arthroscopic surgery was very successful method for treatment OCD. We found only some osteophytes and a radiolucent line in radiography, but by using arthroscopy, we discovered severe synovitis in the lesion and a large OCD flap on the caudo-central area.

Generally, the prognosis of caudo-medial OCD lesions is better than caudo-central lesion, because direct weight is delivered through the defect site in caudo-central lesion (10). The patient fully recovered without any complication, despite the defect was located in caudo-central lesion. The OCD flap which was removed by using arthroscopy is about 19 mm diameter. It is a large size flap in medium to large breed dogs (4).

Reduce inflammation through the alignment of the damaged articular surface and removal of free fragments of cartilage which mechanically irritate articular surfaces brought about satisfactory effect of the surgical treatment (2). We also get a satisfactory result in 4 weeks after surgery.

The arthroscopy over arthrotomy is a two-edged sword. The advantages of arthroscopy are to accurately locate the lesion site, to remove fragments that torn away from the shoulder joint and the convenience of exploring the joint completely (10). On the other hand, the disadvantages of arthroscopy are the large charge, the needs of special instruments and the trained veterinarian for clinical application and some complications (iatrogenic damage to the articular cartilage, obstruction of view by hemorrhage, extravasation of fluid in the surrounding soft tissues, etc.) (1).

Decision of arthroscopic surgery immediately after accurate diagnosis OCD using arthroscopic approach can be a relevant surgical procedure than arthrotomy for treating this disease in dogs (2).

Conclusion

In a patient with OCD, a surgical procedure using arthroscopy has many advantages, like short hospitalization period, rapid healing and fewer side effects. The arthroscopy is a very useful treatment choice, especially in a patient with a large OCD flap.

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