

Exploratory Arthroscopic Treatment to Diagnose and Treat Osteochondritis Dissecans of the Shoulder Joint in a Dog

Choong-Sup Kim, Hae-Beom Lee and Ul Soo Choi¹

College of Veterinary Medicine, Chonbuk National University, Jeonju 561-756, Korea

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Abstract : A 6-month-old, intact male Great Pyrenees (35 kg) was referred with 2 weeks continuous left forelimb lameness to the Chonbuk Animal Medical Center, College of Veterinary medicine, Chonbuk National University. The lameness became worse three days before being referred to the hospital. Upon the physical examination, the patient had pain when the left shoulder joint was palpated, and the lameness was visible in the left forelimb during ambulation on gait examination. There were no remarkable findings on radiological and neurological examination. Osteochondritis dissecans (OCD) was suspected based on medical history and gait tests. As a definitive diagnosis could not be made, exploratory arthroscopic surgery was performed to examine the inside of the shoulder joint. During the operation, mild bicipital tenosynovitis, synovitis and OCD which was located on the caudal medial area of humeral head were revealed. Arthroscopic procedures were used for the treating OCD, including the removal of the OCD flap and debriding of the subchondral defect until hemorrhaging by use of an electrical burr. The patient was discharged a day after surgery. After 2 weeks, the patient again presented at the hospital due to complications, including inflammation of the surgical lesion because of licking and seroma within the subcutaneous tissue. Antibiotics were administered and an aseptic bandage was applied. And simple surgical operations were performed for the removal of the cyst and seroma. Eleven weeks following arthroscopy, the lameness was completely resolved. Arthroscopy has the advantage of allowing gross examination inside the joint capsule. Due to this advantage, arthroscopy is one of the best advanced options for diagnosis in dogs with undiagnosed joint pain.

Key words : Osteochondritis dissecans, shoulder joint, arthroscopy.

Introduction

Osteochondrosis (OC) is a disturbance in the process of endochondral ossification which is disrupted in a focal area of a developing articular surface centered at the osteochondral junction that results in the failure of subchondral bone formation (9). This leads to abnormally thickened cartilage in the focal area which is susceptible to injury due to mechanical stress. Osteochondritis dissecans (OCD) is the clinical manifestation of osteochondrosis, in which a fragment of the articular cartilage is fractured and forms a cartilage flap (4,16). The cause of OCD has not been determined, but a complex of factors, including genetics, rapid growth, over-nutrition, trauma, ischemia and hormonal influences has been implicated (3,6,10,11).

OCD is one of the most frequent causes of shoulder lameness in rapidly growing, medium to giant-breed young dogs (5). The site most affected in the shoulder joint is the caudal-central and caudal-central-medial region of the humeral head (5). There is characteristic pain during hyper-flexion and -

extension of the shoulder and the lameness tends to worsen following exercise but frequently improves after a period of rest (12).

Diagnosis is typically based on history, clinical sign, and physical and radiological examination. Physical examination will reveal pain on extension and flexion of the shoulder joint. A radiological diagnosis can be confirmed by the presence of a radiolucent area, but non-mineralized loose cartilage flaps, which account for 90% of all cartilage flaps in one study, are impossible to detect on plain radiographs (13). Positive-contrast arthrography can be used in these cases with an overall accuracy of 88% (14). Exploratory arthrotomy has been performed in some cases; there is some controversy regarding the effectiveness of the diagnosis and complications that can arise as a result of invasive procedures. Recently, arthroscopy has allowed for more detailed examination of the articular structures and more accurate diagnoses in detecting loose cartilage flaps compared to other conventional diagnostic methods (7).

Treatments previously described for OCD in dogs can be separated from conservative medical treatments and surgical operation via arthrotomy. Conservative medical treatments, including medications such as NSAIDs, weight restriction and moderate exercise and rest tend to require a longer period

¹Corresponding author.
E-mail : uschoi@jbnu.ac.kr

and to have a minimal effect after the occurrence of clinical signs. The cartilage flap has traditionally been removed by arthrotomy, but there are disadvantages to this procedure and complications can arise due to invasiveness. Recently, arthroscopy has replaced arthrotomy in most cases, as it is minimally invasive and has fewer complications (7).

This report describes a surgery via arthroscopy to diagnose and simultaneously treat OCD in the canine shoulder joint.

Case

A 6-month-old, intact male, Great Pyrenees was admitted for evaluation after 2 weeks of continuous left forelimb lameness. The lameness became worse 3 days before being referred to the hospital and there was no history of trauma. Physical examination revealed that the patient had a pain during manipulation, especially in caudal extension of the shoulder joint. No other clinical signs such as swelling or growth were observed. On gait examination, weight-bearing



Fig 1. Plain radiography showed no remarkable findings on left shoulder joint.

lameness was observable in the left limb during ambulation. There were no remarkable findings by plain radiological examinations (Fig 1).

Neurological examination and clinical pathological data were in the normal range. Based on history, clinical signs and the results of examinations, we suspected a problem in the shoulder joint, specifically OCD, leading us to perform exploratory arthroscopy. Cefazolin and tramadol were administered intravenously at doses of 25 mg/kg and 5 mg/kg, respectively. General anesthesia was induced using propofol at a dose of 6 mg/kg and was maintained by isoflurane. Aseptic preparation was then performed on the left forelimb with left upmost lateral recumbency. A lateral approach for arthroscopy of the left shoulder was used as previously described (15). An 18-gauge needle was inserted in a caudo-medial direction for arthrocentesis, and 15 ml of Lactated Ringer's solution was then infused to induce joint distension. Arthroscopic portal, egress, and instrument portals were created in the joint as previously described (8). It was obvious that there was inflammation and hyperplasia of the synovium and bicapital tenosynovitis on the arthroscopic image (Fig 2-A,B). The OCD lesion was detected on the caudomedial humeral head and the cartilage flap was attached on medial humeral lesion edge with a free cartilage end floating in the joint fluid (Fig 2-C). The cartilage flap was removed in small pieces using grasping forceps to avoid flap breaking the flap as it was drawn through the joint capsule. Once the flap was removed, the edge of the OCD lesion was debrided with a power shaver and a curette until bleeding occurred in order to expose the defect to healthy subchondral bone. Joint lavage with two packs of Ringer's solution was performed to wash out the inflammatory mediators and any very small pieces of cartilage flap. Closures were single skin sutures placed only at the portal sites. After surgery, the patient was administered cefazolin by intravenous injection at a dosage of 25 mg/kg for 3 days and meloxicam orally at a dosage of 0.1 mg once a day for 3 weeks. The patient was discharged the day after surgery and restricted to a cage. Periarticular seroma occurred two weeks postoperatively, and was removed surgically. Four weeks after the initial surgery, the function of the affected

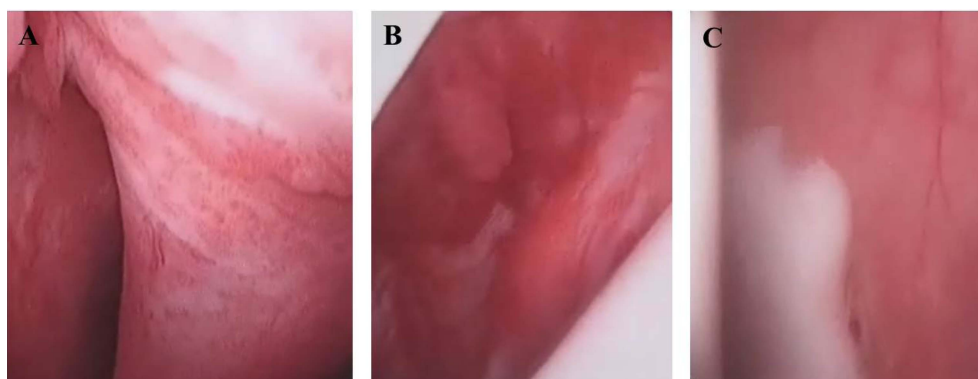


Fig 2. Bicapital tenosynovitis on the arthroscopic image (A). Hyperplasia of the synovium (B). Osteochondritis dissecans on the caudomedial humeral head (C).

limb was good and showed only intermittent lameness. The patient showed perfect limb ambulation and no other discomfort on gait and physical examinations at 11 weeks after the initial surgery.

Discussion

The result of this surgery showed that arthroscopic treatment was a good procedure for many reasons. Most importantly, arthroscopy allows direct inspection of the articular surface and other structures of the joints (1). In this case, radiography did not show any remarkable findings of the affected joint. However, in arthroscopy, there was an OCD lesion, synovitis, and bicipital tenosynovitis, which were not seen on plain radiography. The difficulty in diagnosing OCD in this patient might be attributable to the location of the lesion on the caudomedial humeral head and the fact that plain radiograph did not show the lesion. Positive arthrography can be useful in this instance, but in author's opinion, arthroscopy is superior. Moreover, arthroscopy enables diagnosis and treatment to be combined into one procedure. Other published advantages of arthroscopy over arthrotomy include; decreased patient morbidity, minimal invasiveness, faster patient recovery, faster return to function, and reduced risk of infection (2).

A previous report suggested that the location of the lesion affects prognosis (5). That report divided the location of lesions into caudo-central lesion(type 1) and caudomedial lesion(type 2). Clinical outcome was poor in patients with type 1 lesions because direct loading was transmitted through the cartilage defect. In this case study, the defect was located caudomedially (type 2) and the patient fully recovered after 11th weeks.

Seroma formation has been known to be the most common postoperative complication of arthroscopic treatment (7). In this case, a large volume of fluid had accumulated within the subcutaneous area associated with the arthroscopic portals. The seroma was removed surgically, and no other complications appeared.

Conclusion

In conclusion, it was found that arthroscopic treatment of shoulder OCD is a useful modality over conventional arthrotomy.

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개의 어깨 관절에서 박리성 골연골염의 진단과 치료를 위한 탐색적 관절내시경의 적용

김충섭 · 이해범 · 최을수¹

전북대학교 수의학대학

요 약 : 6개월 된 수컷 Great Pyrenees (35 kg)가 왼쪽 앞다리에 2주 동안 지속된 파행으로 전북동물의료센터에 내원하였다. 파행은 병원 내원 3일 전부터 더욱 심해졌다고 한다. 신체검사 상에서 환자는 왼쪽 어깨 부분에 통증을 보였고, 보행 검사에서 파행을 보이고 있었다. 방사선 검사와 신경계 신체검사에서는 유의적인 소견을 보이지 않았다. 의학적 기왕력과 보행검사를 토대로 박리성 골연골염을 의심하였다. 어깨관절에 대한 확실한 진단을 위해서, 탐색적 관절내시경 수술이 시행되었다. 미미한 두갈래근건초염과, 활막염, 그리고 상완골 머리 후내측에 위치한 박리성 골연골염 병변이 관찰되었다. 연골편의 제거, 연골하골의 변연절제가 관절내시경과 전기 버(electric burr)를 사용하여 실시되었다. 환자는 수술 다음 날에 퇴원하였다. 2주 후, 환자는 술 부를 활아서 생긴 염증과 피하조직에 생긴 장액종으로 인해 내원하였다. 항생제 치료와 무균적 붕대가 적용되었고, 장액종은 수술적으로 제거되었으며, 관절내시경을 실시한 11주 후 환자의 보행은 정상이었다. 관절내시경은 관절낭 안쪽의 구조물 관찰이 가능하기 때문에 진단이 어려운 관절질환에 유용하게 사용될 수 있을 거라 사료된다.

주요어 : 박리성 골연골염, 어깨 관절, 관절내시경