

Surgical Stabilization of Traumatic Medial Luxation of Scapulohumeral Joint and Scapular Fracture in a Dog

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Abstract : A 1 year 4 months old, male Poodle was presented with a history of non weight bearing lameness and pain of the right forelimb by trauma. Orthopedic examination and radiographs were revealed medial shoulder luxation and scapular fracture. Biceps tendon was translocated to the lesser tubercle and secured to the humerus. Despite of it could be a potential cause of degenerative change of the joint, a favorable result was achieved for more than 3 years follow-up.

Key words : biceps tendon translocation, medial shoulder luxation, Poodle, scapular fracture, trauma.

Introduction

Medial instability of scapulohumeral joint is induced by tearing of the medial glenohumeral ligament, subscapularis tendon, and medial joint capsule (3,5,6). Although congenital or developmental laxity may result in medial instability and luxation, trauma is the common cause of the shoulder luxation (2,4,7). Closed reduction and external splintage can be attempted for a traumatic luxation for the treatment soon after injury, there were stresses the need for internal stabilization and poor results with conservative therapy (5,6). The tendon of origin of the biceps brachii muscle has been used to correct medial, lateral, and cranial instabilities, and more recently supraspinatus tendon has been used for the surgical correction of medial luxation (2,6). Despite it has been generally presented favorable outcomes, medial biceps translocation may contribute to progress degenerative joint disease due to articular incongruity on long-term clinical evaluation (7,8). This case describes a case of biceps tendon transposition for rarely occurred traumatic shoulder medial luxation with scapular fracture over three years follow-up.

Case

A 1 year 4 months old intact male toy Poodle was brought to Konkuk University Veterinary Teaching Hospital for evaluation of non-weight bearing lameness and pain of the right forelimb in spite of medical management and Velpeau sling during 8 days after hit by the closing elevator doors. There were no remarkable findings on laboratory profiles except

mild ALP increasing. Orthopedic examination was revealed swelling and instability of the shoulder joint and there were severe pain, crepitation, and instability of the right shoulder joint when the right forelimb was extended. Radiographs were revealed medial luxation of right shoulder joint and small bone fragment was exfoliated from neck of the scapular (Fig 1). There were no concurrent cardiopulmonary injuries. Surgical correction was decided by open reduction and biceps tendon transposition for stabilization. The dog was premedicated with atropine sulfate (Atropine sulfate[®], Je Il Pharm. Co.,



Fig 1. Ventrodorsal radiographs of the right scapulohumeral joint. Note the medial luxation of the shoulder joint and scapular fracture.

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Ltd. Korea, 0.04 mg/kg, SC) and cefazolin (Cefazolin[®], Chong Kun Dang Pharm. Co., Ltd. Korea, 20 mg/kg, IV) as prophylactic antibiotic, and Ringer's solution (Hartmann's sol Inj.[®], Daehan Pharm. Co., Ltd. Korea, 5 ml/kg/hr) was administered during the surgical procedure. Anesthesia was induced with thiopental sodium (Thionyl[®], Daehan Pharm. Co., Ltd. 12 mg/kg, IV) and maintained with isoflurane (Isoflurane[®], Rhodia Organique Fine Ltd., UK) in 100% oxygen (1-2 L/min). The dog was positioned in dorsal recumbency for craniomedial approach. Biceps tendon was freed by incising the transverse humeral ligament and dorsal joint capsule. Since the tendon was transposed medially and secured it to the humerus with a bone screw and a spiked washer (Fig 2). Torn medial joint capsule was repaired by imbrications with heavy absorbable suture. Exfoliated bone fragment from the scapular neck was not removed. Skin and subcutaneous tissue was closed a routine manner. The limb was supported in a Velpeau sling for 14 days after the surgery. The dog bore the weight on the right forelimb immediately after the removal of the Velpeau sling and returned to normal locomotor function at 21 days after the surgery.

Discussion

Scapular fractures are rarely occurred in dogs and cats because the large muscles surrounding scapular protect it from direct injury (3,6). Also, the splinting effect of the surrounding musculature allows single conservative therapy in scapular body or spine fracture unless there is involvement of



Fig 2. Secure biceps tendon medially to the humerus with a bone screw and spiked washer.

the articular surface, instability, and severe displacement (1,3). There was only the exfoliated small bone fragment from scapular neck and it was far from instability or displacement in this case. It was decided that scapular fracture could be treated conservatively. Additionally, scapular fracture highly associated with concomitant injuries including cervical or rib fracture, thoracic trauma, brachial plexus trauma, and suprascapular nerve trauma because of location of the scapular and flat, thin scapular bone (6). Previous study reported concurrent injuries occurred in approximately 70% of scapular fracture cases (1). In this case, shoulder luxation was concurred with scapular fracture and it was the primary cause of the pain and non-weight bearing lameness.

Scapulothoracic medial luxation is relatively an unusual cause of lameness in dog (3,5,6). Congenital luxations are sometimes identified in small breed dog with shoulder dysplasia with an important remodeling of the glenoid, which prevents any successful reduction while traumatic luxation may be seen in all type of dog (4,7). Medial luxation was occurred by trauma in toy Poodle and there was not any sign of remodeling or degenerative changes in articular surfaces in this case. It is need careful evaluation of the medial labrum of the glenoid and the lateral side of the humeral head. Because significant worn or erosion of the articular cartilage and degenerative joint disease could induce long term unsuccessful outcome due to joint instability and incongruity despite of internal joint stabilization (4,5).

Reconstructive procedures with autogenous tissue were a fundamental surgical principle and the various tendon transfers had been used to alter the mechanical environment on the involved articulation, presumable in a manner that would facilitate normal function (7). Although transfer of a supporting structure, such as a tendon, to a new location may offset a particular structural weakness, it also may create a new deficit or otherwise alter the joint motion (8). It has been reported that prosthetic ligament and imbrications techniques have not been successful as biceps tendon transposition in shoulder luxation (5,9). On the other hand, there was a previous study reported biceps tendon transposition might alter shoulder joint motion and such alteration might have negative influence on joint motion and cause degenerative changes in the articular surfaces (8). There was a report which indicated 50% normal return to function (average 2.5 year), 20% improvement with occasional lameness, and 40% improved with persistent lameness of biceps transposition on evaluation of long-term clinical function (7). In this case, a disappointing result of closed reduction and Velpeau sling was required surgical correction such as biceps tendon translocation. The dog returned to normal function and full range of pain free motion after biceps transfer and Velpeau sling for 14 days and there was no sign of degenerative joint disease for 3 years since surgical correction.

In conclusion, surgical translocation of the biceps tendon was effective on reestablishing normal joint function in traumatic medial shoulder luxation, although a follow-up should

conduct through more long time period considering of young age of the dog in this case.

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개에서 발생한 외상성 견관절 내측 탈구와 견갑골 골절의 외과적 교정 1례

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요 약 : 1년 4개월령의 수컷 푸들견이 외상으로 인한 우측 전지의 통증과 들립 과행증으로 내원하였다. 정형 검사와 방사선 검사상에서 내측 견관절 탈구와 견갑골 골절이 확인되었다. 이두근의 힘줄을 작은 결절로 전위시켜 상완골에 고정시켰다. 이 교정은 잠재적인 관절의 퇴행성 변화의 원인이 될 수 있으나 본 환축에서는 3년 이상의 관찰기간 동안 좋은 결과를 보였다.

주요어 : 이두근 힘줄 전위술, 내측 견관절 탈구, 푸들, 견갑골 골절, 외상