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Arthroscopic treatment of nontraumatic elbow ankylosis

Travmatik olmayan dirsek ankilozunun artroskopik tedavisi

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Objectives: This study was designed to evaluate the results of arthroscopic treatment for nontraumatic elbow contractures with the removal of osteophytes and loose bodies of the olecranon process and olecranon fossa.

Patients and methods: Twenty-one patients with ankylosis of the elbow due to degenerative causes were treated with elbow arthroscopy. All the patients were males and the mean age was 43.2 years (range 37 to 54 years). Osteophytectomy of the olecranon process and olecranon fossa was performed in all the cases and additionally, posterior capsular release was performed in six cases. On presentation, the main complaint was limitation of motion accompanied by pain. The mean range of motion was 17° (range 5°-60°) in flexion contractures and 87° (range 60°-100°) in further flexion. The results were evaluated using the Broberg and Morrey's functional scoring system. The mean follow-up period was 18 months (range 12 to 24 months).

Results: The mean flexion contracture improved from 17° to 3° and further flexion from 87° to 122° during the first postoperative two months. The mean flexion contracture was 5° and further flexion was 113° at the end of a year follow-up. There was no pain upon movement within the final articular range of motion. The mean functional scores were 65 (range 61 to 72) and 80.7 (range 78 to 91) before and a year after the treatment, respectively. The results were good in 18 patients (85.7%) and moderate (14.3%) in three patients. No postoperative complications were encountered.

Conclusion: Selective removal of the lesion causing elbow contracture can be successfully performed through arthroscopic surgery with minimal morbidity.

Key words: Arthroscopy/methods; contracture/surgery; elbow joint/injuries/surgery; joint diseases/etiology; range of motion, articular.

Amaç: Bu çalışmada, travmatik olmayan dirsek kontraktürlerinde olekranon proçes ve olekranon fossadaki osteofit ve serbest cisimlerin çıkarılması için yapılan artroskopik tedavi sonuçları değerlendirildi.

Hastalar ve Yöntemler: Yirmi bir hastaya dejeneratif nedenlere bağlı dirsek ankilozu nedeniyle dirsek artroskopisi uygulandı. Tümü erkek olan hasta grubunda ortalama yaş 43.2 (dağılım 37-54) idi. Tüm olgularda olekranon proçes ve olekranon fossada bulunan osteofitler çıkarıldı; ek olarak, altı olguda da posterior kapsüler gevşetme yapıldı. Başvuru anında ana yakınma ağrılı hareket kısıtlılığı idi. Tedavi öncesinde, hastalarda ortalama 17° fleksiyon kontraktürü (dağılım 5°-60°) ve 87° fleksiyon genişliği (dağılım 60°-100°) vardı. Sonuçlar Broberg ve Morrey'in fonksiyonel skorlama sistemine göre değerlendirildi. Ortalama izlem süresi 18 ay (dağılım 12-24 ay) idi.

Bulgular: Cerrahi tedavi sonrası ikinci ayda ortalama fleksiyon kontraktürü 17 dereceden 2 dereceye geriledi; fleksiyon genişliği ise 87 dereceden 122 dereceye yükseldi. Ameliyattan bir yıl sonra ortalama fleksiyon kontraktürü 5°, tam fleksiyon genişliği 113° bulundu. Tüm hastalarda kazanılan eklem hareket genişliği içinde ağrı şikayetinin ortadan kalktığı görüldü. Fonksiyonel skorların ortalaması ameliyat öncesi ve tedavi sonrasında sırasıyla 65 (dağılım 61-72) ve 80.7 (dağılım 78-91) idi. Sonuçlar 18 hastada (%85.7) iyi, üç hastada (%14.3) orta bulundu. Ameliyat sonrası dönemde komplikasyonla karşılaşılmadı.

Sonuç: Artroskopik cerrahi, dirsek kontraktürüne yol açan lezyonun selektif olarak, başarıyla ve en az morbiditeyle çıkarılmasını sağlamaktadır.

Anahtar sözcükler: Artroskopi/yöntem; kontraktür/cerrahi; dirsek eklemi/yaralanma/cerrahi; eklem hastalığı/etyoloji; hareket açıklığı, eklem.

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Nontraumatic elbow contracture can be caused by degenerative changes. The pathophysiology of contracture in degenerative arthritis is synovitis from articular loose bodies that cause fibrosis, joint capsule hypertrophy, and osteophyte formation. Once joint contracture occurs, it undergoes a vicious circle of aggravating pain and contracture.

This study was designed to evaluate the results of arthroscopic treatment for nontraumatic elbow contractures with the removal of osteophytes and loose bodies of the olecranon process and olecranon fossa, with additional partial capsular release when needed.

PATIENTS AND METHODS

Twenty-one patients with ankylosis of the elbow due to degenerative causes without a trauma history were treated with elbow arthroscopy at the Chosun University Hospital. All the patients had been working in a tire factory for more than 10 years and all were males with a mean age of 43.2 years (range 37 to 54 years). Osteophytectomy of the olecranon process and olecranon fossa was performed in all the cases and additionally, posterior capsular release was performed in six cases. On presentation, the main complaint was limitation of motion accompanied by pain. The mean range of motion (ROM) was 17° (range 5°-60°) in flexion contractures and 87° (range 60°-100°) in further flexion. Preoperatively, the patients were informed about the anticipated increase in ROM after surgery. Active range of motion exercises were initiated the day after surgery, starting within the range of motion that was feasible prior to surgery. In seven cases with severe postoperative pain and edema, rehabilitation was performed with braces on. The patients were recommended to increase flexion and extension by 5°-10° from the ROM on admission and were discharged after two to three days.

The change in the severity of symptoms after surgery was evaluated using the Broberg and Morrey's method.[1] The mean preoperative functional score was 65 (range 61 to 72). The mean follow-up period was 18 months (range 12 to 24 months).

Operation technique

With the patient in the prone position and with the tourniquet on, the elbow was flexed to 90° and the posterior portal was made 3 cm proximal to the apex of the olecranon process. Another portal was made for the injection of normal saline and the superolateral portal was made on the lateral side of the humeral triceps tendon to observe the osteophyte of the olecranon process. The arthroscope was then inserted through the proximal lateral portal and the anterior aspect of the coronoid process to observe the osteophyte. The osteotome was applied through the anteromedial portal and osteophyte removal was performed through either the osteotome or an arthroscopic burr (Fig. 1). Loose bodies found in the olecranon fossa were removed simultaneously. The osteotome was used in the direction parallel to the longitudinal axis of the upper limb to avoid neurovascular damage. In cases in which excessive osteophytectomy of the olecranon process might cause instability, an alternative way was used to increase the depth of the olecranon fossa after minimal resection of the olecranon process.

RESULTS

The mean duration of operation was 80 minutes (range 60 to 120 min). Osteophyte formation of the

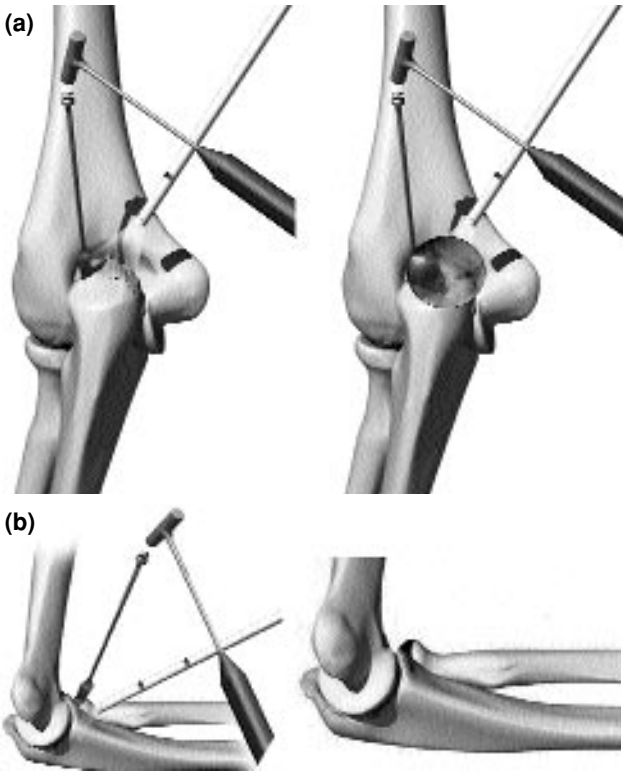

Fig. 1. Illustrations showing **(a)** the posterolateral portal for arthroscopy and the direct posterior portal for working instruments and removal of the olecranon osteophyte, and **(b)** removal of the osteophytes in the coronoid process and the appearance after the removal.

olecranon process and olecranon fossa was found in all the cases under the arthroscope. Loose bodies were found and removed in three cases. In six cases, the bony prominence of the distal anterior humerus was resected with the osteotome. Mild degenerative changes were observed in two cases. There were no complications related to surgery.

The mean flexion contracture improved from 17° to 3° with further flexion from 87° to 122° during the first postoperative two months. The mean flexion contracture was 5° and further flexion was 113° at the end of a year follow-up. There was no pain upon movement within the acquired articular range of motion.

Functional scores ranged from 78 to 91 with a mean of 80.7 at the end of a year postoperatively. The results were good in 18 patients (85.7%) who presented within a short period of time from the appearance of symptoms and in those having a loose body or an osteophyte causing limited ROM.

The results were of average in three patients (14.3%), including one patient with mild degenerative change in the articular cartilage, and two patients in whom severe joint capsule contracture was found and partial capsular release was required because of progressive articular stiffness for over a year.

DISCUSSION

Contracture of the elbow is different from the shoulder or wrist joints in that the elbow lacks compensation from the contiguous joints. The patients have severe complaints when the ROM does not reach 100°, which is needed to maintain a normal life.[2] In this study, the mean ROM for flexion contractures was 17° (5°-60°) and further flexion was 87° (60°-100°).

Acquired causes of elbow contracture include fractures, dislocations, surgery, rheumatoid arthritis, tuberculous arthritis, degenerative arthritis, infective arthritis, synovial chondromatosis, burn scar contractures, overuse syndrome, and osteochondritis dissecans of the elbow region.[3-8] Morrey[9] also classified these as internal causes such as cartilage injuries, discordance of the joint surface, and adhesions, and external causes such as contracture of the joint capsule or collateral ligament. In this study, patients with an etiology of excessive usage and with osteophytic growth and articular contracture due to degenerative arthritis were selected, excluding those with an obvious trauma history.

Elbow contractures are treated by conservative methods such as drug injections, physical therapy, splint, or local injection of nonsteroidal anti-inflammatory drugs, or by arthroscopic treatment[8,10,11] or open surgery.[12,13]

Arthroscopic treatment has the advantage of not only relieving pain but also temporarily slowing down the progression of degenerative joint disease, and increasing ROM. Compared to open surgery, arthroscopic surgery also enables early rehabilitation and minimizes the wound defect and contracture of the joint capsule.[10,14]

The effectiveness of arthroscopic treatment for elbow contractures is reported to be 89% to 94%.[14-18] In this study, improvement in ROM was observed in all the cases. This is mainly due to resolution of the prominent bony ankylosis, which can be found even during simple radiographic studies.

Treatment options for nontraumatic elbow contractures are arthroscopic lavage, osteophyte removal, fenestration of the olecranon fossa, removal of loose bodies, synovectomy, and capsular release.[10,17,18] In this study, the impingement between the olecranon process and the olecranon fossa was detected as the main cause for extension limitation and selective osteophytectomy was performed which resulted in a marked increase in extension.

In general, complications occur in 10% of cases, such as continuous drainage of joint fluid, joint stiffness, iatrogenic cartilage injury, damage related to tourniquet use, hematoma, and transient nerve damage.[19-23] In this study, no complications were encountered due to the following reasons: *(i)* We reduced the operation time within two hours to minimize complications. *(ii)* Each reinsertion of surgery tools even without the cannula was confirmed. *(iii)* The blade of the osteotome was inserted parallel to the long axis of the upper limb to avoid neurovascular damage. *(iv)* The pressure of the infusion pump was maintained at a level sufficient to ensure a clear visual field.

In conclusion, selective removal of the lesion causing elbow contracture can be successfully performed through arthroscopic surgery with minimal morbidity.

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