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Arthroscopic treatment of symptomatic loose bodies in osteoarthritic elbows

Osteoartritli dirsekte eklem içi serbest cisimlerin artroskopik tedavisi

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Amaç: Osteoartritli dirsek ekleminde semptom veren serbest cisim nedeniyle artroskopik cerrahi uygulanan hastalarda klinik ve fonksiyonel sonuçlar değerlendirildi.

Çalışma planı: Çalışmaya, osteoartritli dirsek ekleminde serbest cisim nedeniyle artroskopik cerrahi uygulanan 10 hasta (6 erkek, 4 kadın; ort. yaş 47; dağılım, 30-59) alındı. Sekiz hastada travma öyküsü vardı. Yedi hastada sağ, üç hastada sol dirsek tutulmuştu. Ameliyat öncesinde altı hastada eklem hareket kısıtlılığı ve kilitlenme, beş hastada ise ağrı yakınması vardı. Tüm hastalarda ameliyattan önce standart röntgen ve bilgisayarlı tomografi, ameliyat sonrasında ise standart röntgen ve manyetik rezonans görüntüleme ile eklem içi serbest cisimlerin varlığı ve sayısı araştırıldı. Eklem hareket açıklıkları ölçüldü. Fonksiyonel değerlendirmede Broberg ve Morrey'in skorlama sistemi kullanıldı. Ağrı görsel analog skala ile değerlendirildi. Hastalar ortalama 31 ay (dağılım 7-59 ay) izlendi.

Sonuçlar: Ameliyat öncesi ve sonrası ortalama eklem hareket açıklıkları sırasıyla 100° (dağılım 55°-160°) ve 115° (dağılım 70°-160°) ölçüldü (p=0.05). Hiçbir hastada valgus ya da varus instabilitesi görülmedi. Ameliyat öncesi ve son kontrolde Broberg ve Morrey skorları sırasıyla ortalama 59 (dağılım 45-80) ve 86 (dağılım 59-100) bulundu (p<0.01). Beş hastada mükemmel, üç hastada iyi, iki hastada kötü sonuç alındı. Sekiz hasta ameliyattan memnun kaldığını belirtti ve ortalama 16 günde (dağılım 1-60 gün) normal yaşama döndü. Ameliyattan önce ortalama 7 (dağılım 5-10) olan görsel analog skala skoru ameliyattan sonra 1'e (dağılım 0-4) geriledi (p<0.01).

Çıkarımlar: Osteoartritli dirsekte eklem içi serbest cisimlerin artroskopik tedavisi, iyi seçilmiş hastalarda, düşük morbidite ve hızlı fonksiyonel iyileşme avantajlarıyla ağrının azaltılmasında etkili bir yöntemdir.

Anahtar sözcükler: Artroskopi; dirsek eklemi/radyografi/cerrahi; eklemde serbest cisim/cerrahi; hareket açıklığı, eklem.

Objectives: We evaluated functional and clinical results of patients who underwent arthroscopic surgery for symptomatic loose bodies in osteoarthritic elbow joint.

Methods: Arthroscopic surgery was performed in 10 patients (6 males, 4 females; mean age 47 years; range 30 to 59 years) for symptomatic loose bodies in osteoarthritic elbow joint. Eight patients had a history of trauma. Involvement was on the right in seven patients, and on the left in three patients. Preoperatively, six patients had limited joint movements and locking, and five patients had pain. The presence and the number of loose bodies were investigated by standard radiographs and computed tomography preoperatively, and by radiographs and magnetic resonance imaging postoperatively. The range of motion was measured with a goniometer. Functional assessment was made with the use of the Broberg and Morrey's scoring system, and pain was assessed with a visual analog scale. The mean follow-up was 31 months (range 7-59 months).

Results: The mean range of motion of the elbows increased from 100° (range 55°-160°) preoperatively to 115° (range, 70-160°) at the end of the follow-up (p=0.05). None of the patients developed valgus or varus instability. The mean preoperative and postoperative Broberg and Morrey's scores were 59 (range 45 to 80) and 86 (range 59 to 100), respectively (p<0.01). The results were excellent in five patients, good in three patients, and poor in two patients. The mean visual analog score decreased from 7 (range 5 to 10) preoperatively to 1 (range 0-4) postoperatively (p<0.01). Eight patients were satisfied with surgery and returned to normal activities after a mean of 16 days (range 1 to 60 days).

Conclusion: Arthroscopic surgery is effective in reducing pain in selected patients with symptomatic loose bodies in osteoarthritic elbows, with the advantages of low morbidity and rapid functional recovery.

Key words: Arthroscopy; elbow joint/radiography/surgery; joint loose bodies/surgery; range of motion, articular.

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Osteoarthritis of the elbow is a rare disease resulting in a limitation of range of motion in joint by effecting pain, locking and joint stiffness. Loose bodies within the joint, osteophytes in the olecranon or coronoid process, synovitis, adhesions in the joint, osteochondritis dissecans of the capitellum and the chondromalacia of the radial head are reasons for the limitation of range of motion in the elbow.[1] Open surgery techniques have been disclosed for the treatment of these lesions.[2,4] Presently arthroscopic surgery replaces open surgery more and more.[4,5,6]

In this study, clinical and functional results in patients who underwent arthroscopic excision surgery due to symptomatic loose bodies (LB) in osteoarthritic elbow joint were evaluated retrospectively.

Patients and method

From 14 patients who underwent arthroscopic surgery of osteoarthritic elbow joint due to symptomatic loose bodies (LB) between January 2001 and June 2005; 10 patients with full records with a minimum follow-up period of six months and who turned up for final examination were included in the study (6 males, 4 females; mean age: 47, range: 30-59 years).

While a history of trauma was present in eight of the patients, no etiologic cause was identified for two patients who were housewives.

The presence and number of loose bodies in all patients were assessed by physical examination as well as by standard x-raying and CT preoperatively and by standard x-raying and by radiological examination by means of MRI both postoperatively and during their final call. Joint ranges of motion were measured by goniometer. With regards to functional assessment, besides the visual analog scale (VAS); Broberg and Morrey index comprising of joint range of motion, muscle strength and pain factors and in which a score of 0-59 is regarded as poor; 60-79 fair; 80-94 good and 95- 100 excellent results was used.[7]

The patients were operated under general anesthesia in face-down position, using tourniquet hemostatis, by the same surgeon. No external traction was performed on any of the patients. Y-type set with poir (Sasan, Ankara, Turkey) was used for the distraction of the limited joint range. Standard anterolateral portal was created 2 cm. proximal and 1 cm. anterior to external epicondyle. The joint was penetrated by a 4.0 mm. 30° scope. Following the joint examination, a supplementary antero-medial portal was created 2 cm. proximal to the internal epicondyle, just anterior to the intramuscular septum. Subsequent to the joint debridement, loose bodies were removed. The posterior compartment was then examined by creating a postero-lateral portal at 3 cm. proximal to the olecranon, lateral to the triceps tendon. With the elbow in flexion, a supplementary postero-medial portal was created 3 cm. proximal to the olecranon from the inner surface of the triceps tendon and any loose bodies present were removed. The operation was finalized subsequent to the debridement of the posterior compartment. Portals were closed and arm sling was put on.

Joint range and the presence of any loose bodies were assessed by standard antero-posterior and lateral x-rays obtained from all patients on the first day after the surgery.

Exercises to enhance the joint range of motion were started on the first day after the surgery and return to work within the limits permitted by pain was advised.

Wilcoxon test was used for statistical analysis.

Conclusions

The mean follow-up patient time was 31 months with a range of .7 - 59 months. Seven right and three left elbows were affected. 90% of those were on the dominant side. Preoperatively, six patients had joint motion limitation and locking while five patients had pain complaints. Complaint of a sensation of crepitation with movement was present in all of the patients. Mean preoperative duration of the complaints was 9 months (range: 7-12 months). While two of the patients were describing sports trauma; two of them were employed in heavy jobs (construction, field work) and a history of recurring trauma was present. For the other four patients with histories of trauma, falling on the elbow was determined to be a preliminary cause.

In the preoperative radiological examination conducted through standard antero-posterior and lateral x-rays as well as through CT, limitation in the range of motion of the joint, osteophytic formations in the capitellum, coronoid and olecranon in all patients, as well as a mean of 2 (1-4) loose bodies in the joint

with hypertrophy of the radial head in four patients. All of the LB's detected preoperatively in nine patients were removed by means of the elbow arthroscopy performed. While the number of the loose bodies within the joint in one patient was observed to be four in radiography; only three LB's were found and removed during the arthroscopy. In the postoperative control x-rays of this patient; it was observed that one LB was left in the joint (Figure 1). In one patient in whom the number of in-joint LB's detected preoperatively by means of radiography is equal to the number of those removed during the arthroscopy, a newly formed LB was detected in the final control x-rays (Figure 2, 3). 1-3 loose bodies were removed from the patients during the operations. 73% of those were in the anterior compartment (8 patients) and 27% were in the posterior compartment (3 patients). Extensive in-joint synovial hypertrophies as well as degenerative cartilage lesions were detected and debridement was performed in all patients. Pre- and postoperative mean joint ranges of motion were measured respectively as 100° (range: 55- 160°) and 115° (range: 70-160°) (p=0.05). No valgus or varus instability was present in any of the patients.

According to Broberg and Morrey mean scores which were respectively measured as 59 (range: 45-80) and 86 (range: 59-100) ($p<0.01$) preoperatively and at final follow-up, the end results were five excellent, three good and two poor. Eight patients (80%) stated that they are satisfied with the performed operation and were able to go back to their normal lives in a mean period of 16 (range: 1-60) days. The mean preoperative VAS of 7 (range: 5-10) declined to a mean of 1 (range: 0-4) ($p<0.01$).

In two patients, superficial soft tissue infection curable with antibiotics developed at the joint portal site. None of our patients had any neurological complications.

Discussion

Numerous methods such as open arthrotomy and anterior capsulotomy, distraction arthroplasty and lateral open intervention have been disclosed for the treatment of osteoarthritis of the elbow joint and of the resulting limitation of motion in the joint. [8,9,10] Drawbacks such as technical complexity, requirement of extensive surgical interventions and high risks of complication are present in all of these

Figure 1. Preoperative standard AP and lateral x-rays **(a, b)** and CT images **(c)** in a 57-year-old male patient (No: 1) and early postoperative AP and lateral x-rays **(d)**. The LB not removed during the surgery is visible in the elbow joint indicated with an arrow.

Figure 2. In a 55-year-old male patient (No: 2), preoperative **(a, b)**, postoperative **(c, d)** standard AP and lateral x-rays and preoperative CT (e) as well as standard AP and lateral x-rays **(f, g)** and MRI **(h)** image at the last control. Recurring LB is visible (arrow).

methods. Arthroscopic methods on the other hand include numerous benefits like the ability to examine both surfaces of the joint at a single session, the ability to remove loose bodies, performing synovial biopsy and in-joint debridement, better cosmetic results, earlier postoperative rehabilitation and rapid functional recovery.[1, 11] Performing arthroscopic release of loose bodies, synovectomy and anterior capsulectomy on a patient who developed post-traumatic flexion contracture, Nowicki and Shall report-

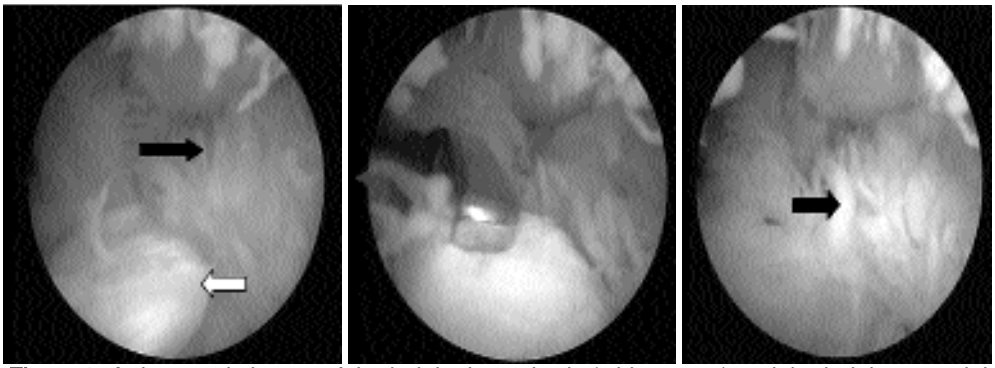

Figure 3. Arthroscopic image of the in-joint loose body (white arrow) and the in-joint synovial hypertrophy (black arrow) in the same patient (No: 2). Loose body was removed and debridement was performed.

ed a good result.[12] In another study conducted on 35 patients all having pain and limitation of motion of the joint preoperatively, the pain was eliminated in all patients with a six degrees of improvement in elbow extension.[1] In a study conducted on a series of 33 patients for arthroscopic removal of loose bodies in the joint, significant improvement in 89% of the patients was reported.[13] We performed arthroscopic removal of loose bodies and soft tissue debridement on our patients. Satisfactory results have been achieved in 80% of our patients. In one of the patients with poor results, it was not possible to remove all the in-joint LB's in the course of the arthroscopy. The LB detected in the posterior compartment was missed during the operation. Although the anterior and posterior compartments have been examined in all of our patients; it is possible to overlook loose bodies especially in elbows where the joint range is reduced due to osteoarthritis. It is possible to come across similar problems in the literature.[13] Accuracy and thorough examination of the anterior and posterior compartments are crucial in achieving successful results. In the other patient with poor results, it was observed during the follow-up that a new LB had formed. The patients should be warned about the possible recurrence of symptomatic LB's in the osteoarthritic elbow joints after being arthroscopically removed and this should be taken into account during the follow-up. Changes in the functional and pain scores of our patients are statistically significant. Nonetheless, the increase in overall range of motion of the joint is statistically insignificant. Especially in osteoarthritic elbows, the anticipated key objective of the joint debridement and of the removal process of loose bodies should be elimination of the locking and reduction in pain rather than enhancement of the range of motion of the joint and the patients should be informed accordingly for the sake of patient satisfaction. In traumatic elbow joint osteoarthritis, mechanical symptoms could be impeded and pain could be reduced with the debridement of the osteophytes, with the removal of loose bodies and even with the excision of the radial head arthroscopically.[1, 14] In two different series including 12 and 21 patients, subsequent to a follow-up period of two years it was reported that pain was reduced significantly, locking was eliminated and a moderate improvement was obtained in the range of motion of the joint.[5, 11] Only in-joint soft tissue debridement was performed and the loose bodies were removed in our study group. The aim of this intervention was to reduce the pain and to slow down the progress of the arthritis by arthroscopic removal of the pain inducing in-joint LB's which lead to mechanical symptoms. Patient selection is extremely important in attaining these objectives. This method could be beneficial in patients with moderate osteoarthritis with complaints of locking and pain due to LB's in the joint rather than complaints about the limitation of motion. Application of other methods might prove to be more appropriate for advanced cases wherein the main complaint is related to the limitation of range of motion and pain induced by osteoarthritis.

Standard anterior-posterior x-rays and CT was used for preoperative radiological examination of our patients whereas MRI was used both postoperatively and in the final call in order to assess the cartilage structure as well. The numbers of LB's detected via standard anterior-posterior and lateral x-rays and via CT was equal in all the patients in our series. In the presence of symptomatic in-joint LB's which could be demonstrated radiologically, further examinations might not be required and plain x-rays could be sufficient.

In two of our patients, superficial soft tissue infection curable with antibiotics developed at the joint portal site. Elbow arthroscopy is a considerably safe method when applied appropriately in the technical sense. It is possible to safeguard the ulnar nerve if the postero-medial portal described for the posterior compartment is created just at the edge of the triceps muscle, with the elbow in flexion. As a result of this procedure, none of or patients demonstrated any neurological complications as per the literature.[5,11,13]

Satisfactory results of 80% attained in our patients are short-term ones and further follow-up is required in order to obtain long-term results. Furthermore, it might be possible to attain a better range of motion in the joint by supplementing the surgery method by capsular flexion as well as by the removal of osteophytes. The patients should be followed up closely in order to detect possible formation of new loose bodies and to determine whether there are any increases in the osteoarthritic changes.

A rise in the arthritic symptoms in the elbow joint was detected in three of our patients during the controls. While the arthroscopic removal of LB's in elbow osteoarthritis does not prevent the progress of the osteoarthritis; most probably slows it down. For this however, comparative prospective studies are required.

Finally, we consider the arthroscopic treatment of LB's in elbow osteoarthritis an effective method on well chosen patients with the advantages of lower morbidity and quick functional recovery as well as in reduction of the pain.

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