



The results of open surgical treatment in patients with chronic refractory lateral epicondylitis

Kronik, konservatif tedaviye dirençli lateral epikondilitte açık cerrahi tedavi sonuçları

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Amaç: Konservatif tedaviye yanıt vermeyen kronik lateral epikondilitte uyguladığımız açık cerrahi tedavinin klinik ve subjektif fonksiyonel sonuçları değerlendirildi.

Çalışma planı: Lateral epikondilit tanısı ile açık cerrahi girişim uygulanan 11 hasta (7 kadın, 4 erkek; ort. yaş 42; dağılım 29-56) incelendi. Cerrahi tedaviden önce tüm hastalara en az bir yıl süreyle konservatif tedavi uygulandı ve yanıt alınamadı. Cerrahi işlem, ekstansör orijinin gevşetilmesi, dejeneratif dokunun eksizyonu, anterior lateral kondilin dekortikasyonu ya da drillenmesi ve ekstansör tendon onarımını içermektedir. Hastalar Verhaar ve ark.nın ölçütlerine göre değerlendirildi. Ortalama izlem süresi 29 ay (dağılım 18-45 ay) idi.

Sonuçlar: On hastada (%90.9) iyi veya mükemmel, bir hastada (%9.1) orta derecede sonuç elde edildi. Ortalama işgücü kaybı iki aydı. Dokuz hastada ameliyat sonrası üçüncü ayda ağrı tamamen kayboldu. Hiçbir hastada ameliyat sahası ile ilgili sorun olmadı. Subjektif fonksiyonel değerlendirmede, 10 hasta sonuçtan ileri derecede memnun olduğunu, bir hasta ise kısmen memnun olduğunu belirtti.

Çıkarımlar: Konservatif tedaviye yanıt vermeyen kronik lateral epikondilitli olgularda, ekstansör tendonların yapışma yerinden gevşetilmesi ve dejeneratif dokuların eksizyonunu içeren açık cerrahi tedavi, başarı oranı yüksek bir yöntemdir.

Anahtar sözcükler: Dirsek eklemi/patoloji/cerrahi; hareket açıklığı, eklem; tendon yaralanması/patoloji/cerrahi; tenisçi dirseği/patoloji/cerrahi.

Objectives: We evaluated the clinical and subjective functional results of open surgical treatment in patients with chronic refractory lateral epicondylitis.

Methods: Eleven patients (7 females, 4 males; mean age 42 years, range 29 to 56 years) underwent open surgical treatment for chronic refractory lateral epicondylitis. All the patients had received conservative treatment for at least a year without favorable response. Surgical procedure included release of the lateral extensor origin, excision of the degenerative tissue, decortication or drilling of the anterior lateral condyle, and repair of the extensor tendons. The results were evaluated according to the criteria proposed by Verhaar et al. The mean follow-up was 29 months (range 18 to 45 months).

Results: The results were excellent or good in 10 patients (90.9%) and acceptable in one patient (9.1%). The mean time to return to work was two months. Nine patients were free of pain in the forearm in the postoperative third month. No wound-related complications were encountered. On subjective evaluations, 10 patients reported full satisfaction, and one patient reported partial satisfaction with the result of the treatment.

Conclusion: Open surgical procedure including release of the origins of the common extensor tendons and excision of the degenerative tissue yields favorable results in the treatment of patients with chronic refractory lateral epicondylitis.

Key words: Elbow joint/pathology/surgery; range of motion, articular; tendon injuries/pathology/surgery; tennis elbow/pathology/surgery.

Lateral epicondylitis (LE) or tennis elbow is the most common afflict of the elbow (1-3% of the general population). It mainly occurs in young adults with athletic activities whereas it is associated with occupational activities in elder people.^[1] For its pathophysiology, several conditions such as tears resulting from recurrent microtraumas in the extensor tendon, periostitis, bursitis, aseptic necrosis, radiocapitellar chondromalacia and nerve entrapment of the posterior interosseous nerve have been suggested.^[2-4]

Controversy exists also in the treatment of the lateral epicondylitis. The condition is recovered by conservative treatment in 90-95% of the cases while it becomes chronic in 5-10% of the cases. Surgical intervention is indicated in cases where no response was obtained with conservative treatment.^[5,6] In spite of presence of more than 40 surgical methods defined for lateral epicondylitis, superiority has been demonstrated for none of them.^[7] It mainly results from the fact that LE is a self-limiting condition; its pathophysiology has not been well defined; number of prospective randomized studies is insufficient; and there are various factors affecting LE.^[8]

In recent years, tendency to use minimal surgical approaches such as percutaneous or arthroscopic extensor release has been increasing because of similar results with the surgical treatments.^[9-12] The present study retrospectively evaluated the results of the open surgical procedure in chronic and treatment-resistant LE.

Patients and method

The study included 11 patients (7 female, 4 male; mean age 42 years; range 29 to 56 years) who had received conservative treatment for LE at least for a period of 12 months between 1998 and 2002, and underwent open surgical procedure due to lack of improvement.

Eight cases had dominant, and three cases had non-dominant extremity involvement. Conservative treatment included oral nonsteroid antiinflammatory drugs, use of LE brace (for all patients), iontophoresis rehabilitation (4 patients) and local steroid injection (mean administration 3.2 for all patients; range 1 to 5 injections). Mean period of symptoms was 27.3 months (range 12 to 46 months). The diagnosis

was made based on the tenderness in the origin of the extensor carpi radialis brevis (ECRB) muscle and increased tenderness of dorsiflexion of the wrist against resistance and of forearm supination. All cases had tenderness in the origin of ECRB. No pathological finding was seen in the bilateral radiography of all cases. The electromyography results for the upper extremity were within normal limits. Evidence of macroscopic degeneration was observed in four cases (36.4%) during the surgical procedure.

Surgical technique

The elbow was flexed to 90° and a pneumatic tourniquet applied to the proximal arm in order to obtain an area free from blood in supine positioned patients under general or regional anesthesia.

For surgical technique, conventional method defined by Nirschl and Pettrone^[13] was preferred. Firstly, the skin at lateral elbow was obliquely incised to expose the origin of the composite extensor tendon. The tendon of the extensor carpi radialis longus (ECRL) was excised to detach it from the lateral epicondyle so that the extensor carpi radialis brevis muscle was exposed, and degenerated part was excised. Composite extensor tendon was elevated and detached from the lateral epicondyle. The region was decorticated by means of curette for blood flow and in order to accelerate the healing of the detached tendon. No other intervention was undertaken as none of the cases had additional intraarticular pathology such as free substance, degenerative joint disease and effusion during the preoperative evaluation. Composite extensor tendon origin was sutured again onto the lateral condyle, paying particular attention to maintain the muscle lengths. Excised ECRB and ECRL were restored by absorbable sutures.

At postoperative period, splint was applied to the wrist at 90° flexion for two weeks. In the following four weeks, ROM and stretching exercises of the hand and wrist were initiated while at weeks 6-9 resistance and eccentric motions were started at the forearm and wrist. Normal activity was allowed after the week 9.

Patients were evaluated according to the criteria proposed by Verhaar et al.^[7] which includes presence of pain on the lateral epicondyle, satisfaction

with the treatment, subjective assessment for the strength of gripping and presence of pain on resisted dorsiflexion of the wrist. Results were classified as excellent, good, moderate and poor. Mean follow-up was 29 months (range 18 to 45 months).

Results

According to the criteria proposed by Verhaar et al.^[7], the results were excellent in five (45.5%), good in five patients, and moderate in one patient (9.1%). The patient with moderate result had non-dominant upper extremity involvement, and a pain emerging with activity on the lateral epicondyle after the month 24. All patients had improvement in terms of pain and function compared to their preoperative conditions. Nine patients were completely pain-free at the postoperative month 3. Mean labor loss was two months. None of the patients experienced wound-related complications. All patients, except one, were satisfied with the outcome. The patient with moderate outcome expressed partial satisfaction.

Discussion

Various methods have been suggested so far for the conservative and surgical treatments of LE. Ninety - ninetyfive percent of the patients respond well to the conservative treatment. Therefore, primarily conservative treatment should be considered for LE, and surgical treatment should be planned if no improvement is observed in the complaints within one year.

Nirschl and Pettrone^[13] and Kraushaar and Nirschl^[14] proposed that the pathology is associated with the origin of the composite extensor tendon, specifically in the ECRB tendon. Same authors indicated that response time to microtrauma should be evaluated in four phases (phase I- inflammation; phase II- tendinosis or angiofibroblastic degeneration; phase III- tendinosis and tear; phase IV- fibrosis and soft-hard tissue calcification), and they suggested to use the term “angiofibroblastic tendinosis” as the name epicondylitis evokes an inflammatory process and atypical fibroblast and vascular tissue are common in LE.

Even if nearly 40 surgical techniques have been described for the surgical treatment of lateral epicondylitis, they can be gathered in five groups.^[7]

First group includes open or percutaneous release of the origin of the composite extensor tendon. Proximal or distal extension of the extensor carpi radialis brevis muscle by Z-plasty is also included in this group. A success rate of 54-99% was reported by surgical procedures based on the release of composite extensor tendon. By percutaneous technique, Baumgard and Schwartz^[15] reported good results with 92% and Yerger and Turner^[16] with 94%. Rayan and Coray^[17] reported a success rate of 95% by proximal VY plasty. Verhaar et al.^[7] obtained successful results (91%) by open tenotomy, and Öztuna et al.^[12] by percutaneous technique.

The methods in the second group consist of excision of the torn or degenerated origin of the extensor tendon and repair of the defect. Success rates reported vary between 77% and 94%.^[5,13,18] The third group includes denervation of the lateral epicondyle defined by Wilhelm and Gieseler^[19] for refractory LE. The fourth group consists of intra-articular procedures, including partial and total excision of the annular ligament, synovectomy and release of the origin of the composite extensor tendon accompanied with debridement of the arthrotic radiocapitellum. Success rates vary between 75% and 100%.^[3,6] Those procedures are not employed anymore in cases without intraarticular pathology during the preoperative evaluations.

The fifth group includes procedures of releasing the posterior interosseous nerve at the radial tunnel and incision of the fibrotic edge on the superficial part of the supinator muscle. Leppilahti et al.^[20] achieved 50% success with this method, and indicated that this method would not be sufficient alone in chronic LE.

Producing good clinical results similar to each other with diverse methods in the treatment of the same pathology can be explained through interventions at different phases for the lesion differing in terms of histology. Applications of local steroid injection, ultrasound, galvanic electric and iontophoresis may influence, even alter the local pathological process. Selection of a surgical technique is challenging due to discrepancy of the histopathological processes in LE and plenty of surgical techniques involved.

A degenerative pathological tissue was macroscopically observed in the origin of the composite extensor or ECRB tendons in four of our cases (36.4%). We didn't perform any histological analysis. Also, some other studies including macroscopic observations reported pathology in 9.5-29% of the patients.^[7,17] Verhaar et al.^[7] found fibrovascular infiltration in 46% of cases and mucoid degeneration in 27% in the area of proximal attachment of the ECRB tendon. Therefore, almost all of the current surgical methods are intended for the origins of the composite extensor and ECRB tendons.

In recent years, surgical treatment of LE with percutaneous or arthroscopic techniques became popular as they are the least invasive techniques. As the arthroscopic technique employs intraarticular work, lesions of synovite and cartilage are also managed, and rehabilitation runs faster since the mechanism of the composite extensor tendon is not released.^[9-12] However, in the arthroscopic technique and the percutaneous technique where tissues cannot be efficiently seen, ganglion cyst and similar lesions in the extensor tendon can go unnoticed. A ganglion cyst inside the composite extensor tendon was reported in two cases.^[7,17] Very high success rates achieved with percutaneous methods led to questions on the necessity of debridement. Similar to various other studies, we routinely used local steroid in our patients. Histological variations may result from that. On the other hand, Altay et al.^[21] demonstrated that local steroid treatment is not effective in LE.

The main purpose of the open surgical treatment for LE using the Nirschl-Pettrone method^[13] is to provide local blood flow on the epicondyle and obtain a healthy scar tissue, removing the degenerated or torn tendon. Achieving a healthy scar tissue may not be possible only by release of the composite extensor tendon. We removed the pathological tissue, and local blood flow was enhanced by decortication or drilling; and good-excellent results were achieved at a rate of 91% by this method, encouraging the formation of a healthy scar tissue. Despite use of different evaluation criteria, Nirschl and Pettrone^[13], and Rosenberg and Henderson^[18] reported similar success rates.

In conclusion, the Nirschl and Pettrone technique produces successful results in the absence of pathologies like concomitant cervical spondylosis, entrapment of posterior interosseous nerve, lateral elbow instability and osteochondritis dissecans in LE unresponsive to the conservative treatment. However, we believe that further prospective randomized studies comparing various surgical techniques are required for selecting the best option in the LE treatment.

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