Cubital tunnel syndrome, simple decompression, is it effective?

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Abstract

Background: Cubital tunnel syndrome is the second most common entrapment neuropathy in the upper limb; however, surgical treatment of the ulnar nerve entrapment at the elbow remains controversial. Objective: To assess patient outcomes and complication rates after simple decompression of the ulnar nerve in cubital tunnel syndrome. Subjects and Methods: A retrospective clinical review of 30 patients who underwent simple decompression of the ulnar nerve for cubital tunnel syndrome in a 5-year period. Patients were diagnosed by a history, clinical examination and a positive electrodiagnostic test. Results: Out of the 30 patients, 21 patients are males and 9 patients are females. The mean age of the patients in this study is 39.5 years (range from 27 to 52 years). Favorable clinical outcomes were obtained on 26 patients (86.5%). Superficial wound infection has observed in 2 patients (6.5%). Conclusion: Simple decompression of the ulnar nerve is effective and reliable treatment for cubital tunnel syndrome. The results and complications in this series were comparable with other publications.

Key words: Cubital tunnel, simple decompression, ulnar nerve

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Introduction

Cubital tunnel syndrome (CUTS) is the second most common entrapment neuropathy of the upper extremity.\textsuperscript{1,2} Despite the uniqueness of the condition; the surgical options have remained controversial in the literature, without definitive studies to support one technique over another. Moreover, the indications for surgery have not been well delineated.\textsuperscript{3,4}

It is likely that (CUTS) is not a single entity but rather is a heterogeneous group of pathologies causing compression of the ulnar nerve in the cubital tunnel. Cubital tunnel syndrome may develop because of various factors including repetitive elbow motion, prolonged elbow flexion, or direct compression.\textsuperscript{5} The most common potential sites of the ulnar nerve compression include the medial intermuscular septum, the arcade of Struthers, the cubital tunnel, and the deep flexor aponeurosis. Anconeus epitrochlearis is an aberrant muscle, which has been reported as a cause of the cubital tunnel syndrome.\textsuperscript{6,7}

The symptoms of the cubital tunnel syndrome are usually insidious in onset particularly when the neuropathy is related to repetitive activities. Patients will notice numbness and tingling about the ring and small fingers that often associated with medial elbow or proximal forearm pain.\textsuperscript{5}

Multiple studies have compared the outcome of surgery for cubital tunnel syndrome (CUTS). Yet there are no clear guidelines for treatment.\textsuperscript{8} Different surgical approaches for cubital tunnel release have been used, from medial epicondylectomy to the recently added endoscopic in situ decompression.\textsuperscript{8,9} There is a vast amount of literature comparing the outcomes of the different approaches, but the results of different studies have not resulted in clear-cut guidelines for treating surgeon.\textsuperscript{10}

**Aim of the work:** The aim of this study to assess outcome of simple decompression of ulnar nerve in cases of CUTS. Critical review on the literature is given.
Subjects and Methods

This is a retrospective clinical review of 30 patients who underwent simple decompression of ulnar nerve for cubital tunnel syndrome in a 5-year period (2005-2009). Patients were diagnosed with (CUTS) by a history and clinical examination that were positive for numbness and tingling in an ulnar nerve distribution, with or without weakness in ulnar nerve innervated muscles on manual muscle testing.

All patients had nerve conduction tests and electromyography that were positive for compression of the ulnar nerve within the elbow segment.

All patients treated for the (CUTS) in the last 5 years were included. CUTS was defined by a subjective pain, numbness and weakness in the little and ring fingers, a positive Tinel test at the elbow, muscle atrophy and decreased grip strength. All of the patients had positive electro-diagnostic testing.

Exclusion Criteria included patients had surgery for traumatic ulnar nerve injury such as surgery after open injury. Patients presenting with systemic diseases affecting the peripheral nerves were excluded. Patients had diseases of the neuromuscular junction (Guillain-Barré syndrome, myasthenia gravis and polyneuropathy) were excluded. Patients with cubitus valgus deformity of the elbow were excluded.

Medical history and physical examinations were recorded. Symptoms that were recorded including pain, numbness, severity of symptoms, subjective pain and paraesthesia. Signs were examined such as sensory loss, muscle atrophy, intrinsic weakness and the results of an elbow flexion test.

Operative treatment was standardized according to the following protocol. The surgery was performed through a direct approach to the cubital tunnel. In situ neurolysis was performed from proximal to distal protecting all nerve branches of the nerve, pressure and/or fibrosis was removed well from the arm proximally, through Osborne's ligament and into the
origin of the flexor carpi ulnaris and fascia. The nerve was not skeletonized and only external neurolysis was performed.

Statistical methods: Dichotomous or categorical variables were presented as number and percent. Mean and standard deviation were calculated for continuous variables if they were normally distributed and median with range were calculated if they are abnormally distributed or has outliers. SPSS-16 Package was used for calculation of these data.

Results

This is a retrospective clinical review of 30 patients, who underwent simple decompression (SD) of the ulnar nerve for cubital tunnel syndrome in a 5-year period. Out of the 30 patients, 21 patients are males and 9 patients are females. The mean age at the time of the surgery was 39.5 years (±12.5). Two patients reported bilateral CUTS. The mean time from onset of symptoms to surgery was 14.5 months. Follow-up period was between 6 and 55 months (median 32 months). The presenting signs and symptoms are described in table 1.

Table 1: Preoperative symptoms and signs

<table>
<thead>
<tr>
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<th>%</th>
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<tr>
<td>Subjective weakness</td>
<td>27</td>
<td>90%</td>
</tr>
<tr>
<td>Objective weakness</td>
<td>25</td>
<td>86.5%</td>
</tr>
<tr>
<td>Muscle atrophy</td>
<td>21</td>
<td>70%</td>
</tr>
<tr>
<td>Sensation decreased</td>
<td>18</td>
<td>60%</td>
</tr>
<tr>
<td>Pain(ulnar nerve distribution)</td>
<td>15</td>
<td>50%</td>
</tr>
</tbody>
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n: Number of patient, %: percent

To assess post-operative outcome, patients were categorized according to postoperative improvement of neural function (table 2). 18 patients experienced a good recovery (60%). 8 patients experienced a very good recovery (26.5%). Two patients experienced a fair recovery (6.5%). No improvement was observed in 2 patients. None of the
patients was made worse by surgery. Superficial wound infection has observed in 2 patients (6.5%).

**Table 2:** Grading of outcome

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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<tr>
<td>Very good</td>
<td>Asymptomatic, no subjective complaints</td>
</tr>
<tr>
<td>Good</td>
<td>No subjective complaints, paresis grade 4/5 (improvement of 1 grade obligatory), minor sensory deficit.</td>
</tr>
<tr>
<td>Fair</td>
<td>Minor subjective complaints, minor sensory deficit and light degree of atrophy, paresis grade 3/5 or 4/5 with improvement at least 1 grade postoperatively.</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td>Major subjective complaints, marked sensory and motor deficit and atrophy without improvement after surgery.</td>
</tr>
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**Discussion**

Disagreement on the correct surgical treatment of ulnar neuropathy has existed for 30 years. It was a time when Osborne and Feindel introduced decompressive surgery without nerve transpositions. These authors noted a common operative technique in all the procedures; decompression of the ulnar nerve at its entrance to the cubital tunnel. In the following time the alternative operative technique of medial epicondylectomy was no longer accepted. Also subcutaneous or intramuscular anterior transposition was used less frequently. Interfascicular neurolysis, only favoured by few authors had to be give up because of clinical deterioration after surgery. Most studies have attempted to compare different surgical treatments for CUTS, assuming that CUTS is a homogenous entity that is best treated by one type of surgery. Even a recent meta analysis performed by Macadam and colleagues could not clearly determine a superior treatment approach.

The leading pre operative signs in our study were impairment of motor function or atrophy. Less often, sensory disturbance or subjective sensory complaints were reported. These findings correspond with the literature, despite the fact that some authors report a higher incidence of dysesthesia in their patients.
Sunderland described the intraneural topography of the ulnar nerve at various levels of the arm. At the medial epicondyle, the sensory fibers of the hand and the motor fibers to the intrinsic muscles are superficial whereas the motor fibers to flexor carpi ulnaris and flexor digitorum profundus are deep. This may explain the common finding in cubital tunnel syndrome of weakness of the ulnarly innervated intrinsic muscles and sensory loss but relative sparing of flexor carpi ulnaris and flexor digitorum profundus strength.\textsuperscript{26,27}

In our study, 86.5\% of our patients showed a good or very good response to surgery. This was independent from predisposing causes. Similar results for simple decompression were obtained by other authors. Pain saw good result in 86\% \textsuperscript{11}, Assmus observed a favorable outcome on 93\% and in Leroux's series\textsuperscript{15}, 80\% had a good response to surgery. The studies, which investigate transposition surgery of the ulnar nerve, report comparable good results. Hagstom obtained improvement of symptoms in 78\% \textsuperscript{28} and Nigst reported recovery in 92\% of his patients\textsuperscript{29}, but his follow-up group contained only 30 out of 300 patients. Gerl found good results using submuscular transposition in 86\%, but less good outcome using subcutaneous transposition (59\%).\textsuperscript{30} Even less favourable results for subcutaneous transposition are described by Mooji with 46\% good recovery of symptoms.\textsuperscript{31} Chan compared 120 patients who underwent subcutaneous transposition with 115 patients treated by SD. Equally in both groups 82\% had a positive response to surgery. However, 30\% of patients treated by SD became asymptomatic, whereas, only 18\% of patients recovered fully after anterior transposition.\textsuperscript{32} In severe cases with paresis, Foster obtained similar results for both operative techniques; numerous other studies confirm these findings.\textsuperscript{11,21,33,34}

While anterior transposition leads to similar postoperative results compared with SD, the complication rate is significantly lower in SD. The lack of improved neural function in anterior transposition might be due to vascular lesions to the vasa nervorum that occur when the nerve is circumferentially isolated.\textsuperscript{11,35} Other authors stressed that insufficient
mobilization and kinking of the nerve may explain the deterioration after transposition surgery. Persistent postoperative pain in the forearm was described after anterior transposition, possibly caused by intra-operative trauma to the medial cutaneous nerve of the forearm. In SD no major complications are reported. Leroux described local wound infection in one case, and local haematoma without clinically persistent consequences in another patient. We observed two patients with superficial wound infection and none of our patients were made worse by surgery.

**Conclusion**

We conclude that simple decompression is the treatment of choice for entrapment of the ulnar nerve in the cubital tunnel. Compared with the results of anterior transposition, simple decompression is at least equally successful, but the complication rate is significantly lower. Additionally, the operation is less traumatic for the patient, as treatment can be given on outpatient basis. Early surgery is very important, since the effect of simple decompression depends on the duration of the symptomatology and presence of atrophy.

**References:**


الملخص العربي

هل تحرير العصب البسيط للمرضى الذين يعانون من متلازمة النفق المرفقي فعال

إشتملت هذه الدراسة على 30 مريضاً منهم 21 للذكور و9 للإناث ممن يعانون من متلازمة النفق المرفقي (إنضغاط العصب الزنيد عند المرفق) وكان متوسط السن 39.5 سنة (من 27 – 52 سنة).

وبعد الفحص الإكلينيكي وإجراء تخطيط كهربائي للعصب تم إجراء الجراحة وتحرير العصب من الضغط الواقع عليه دون الحاجة لنقل العصب من مكانه أو استئصال أجزاء من عظام المفصل (القيمة الإنسانية) وكانت النتائج جيدة في 26 مريضاً (86.5%) وحدث إلتهاب سطحي في الجرح في عدد 2 مرضى (6.5%) وكانت النتائج والمضاعفات في هذه الدراسة مطابقة لغيرها من الأبحاث المنشورة وخلصت الدراسة إلى أن هذه العملية كافية ومفيدة لتحرير العصب ويمكن الأعتماد عليها كطريقة جراحية بسيطة لعلاج مرضى متلازمة النفق المرفقي.