ORIGINAL ARTICLE

Patient Education for the Treatment of Ulnar Neuropathy at the Elbow

Kenichi Nakamichi, MD, Shintaro Tachibana, MD, Masayoshi Ida, MD, Seizo Yamamoto, MD

ABSTRACT. Nakamichi K, Tachibana S, Ida M, Yamamoto S. Patient education for the treatment of ulnar neuropathy at the elbow. Arch Phys Med Rehabil 2009;90:1839-45.

Objective: To assess the effect of patient education, the simplest conservative treatment of ulnar neuropathy at the elbow, and establish its indication.

Design: Patients with ulnar neuropathy at the elbow were treated by education. Its effects and factors affecting outcome were investigated. The length of the treatment was at least 3 months. If the symptoms were improving, the follow-up was lengthened. All of the improved patients were followed up at least for 1 year after they reached a plateau of improvement to check recurrence.

Setting: Patients were selected from an outpatient clinic of a general hospital.

Participants: Patients (N=77; 80 nerves) with ulnar neuropathy at the elbow diagnosed clinically and electrophysiologically.

Interventions: Patient education on the pathophysiology and activity modification to unload the ulnar nerve from mechanical stress.

Main Outcome Measures: Outcomes were graded as excellent, good, fair, or poor with use of the modified Akahori's classification system. Patient satisfaction was graded as 1 (low) to 5 (high). Repeat nerve conduction studies were performed in those who gave consent, and results were graded as excellent, good, fair, or poor.

Results: Fifty-three nerves (66%) had excellent or good outcomes. Multivariate logistic regression analysis revealed that degenerative change (graded as normal, mild, moderate, or severe) was associated with the outcome, while age, sex, side, duration and severity of the disease, diabetes, dislocation of the nerve, and smoking were not. Excellent or good outcomes were obtained in 43 (80%) of 54 nerves with no or mild degeneration and 10 (38%) of 26 nerves with moderate or severe degeneration. Recurrence was less frequent in the former (2 of 43 nerves, 5%) than the latter (4 of 10, 40%). The outcomes strongly correlated with the satisfaction scores and repeat nerve conduction study results.

Conclusions: Patient education is effective for a considerable number of patients with ulnar neuropathy at the elbow. Whether this is indicated depends on the grade of elbow degeneration. Those who have no or mild degeneration respond better to this treatment with a lower rate of recurrence than those with more severe degeneration regardless of age, sex, side, duration and severity of the disease, presence or absence of diabetes and dislocation of the nerve, and smoking status.

Key Words: Cubital tunnel syndrome; Patient education; Treatment.

ULNAR NEUROPATHY AT the elbow is the second most common entrapment neuropathy after carpal tunnel syndrome. It frequently occurs when the ulnar nerve undergoes compression or traction at the cubital tunnel, which is bounded by the medial epicondyle anteriorly, the medial humeral trochlea and ulnohumeral ligament laterally, and the fibrous arcade formed by the 2 heads of the flexor carpi ulnaris posteromedially. Degenerative change of the elbow is a major cause in older patients, and younger persons may have it as a result of repetitive elbow motion.[1] It also occurs secondary to posttraumatic cubitus valgus deformity, which is referred to as tardy ulnar palsy. Dislocation of the nerve on elbow flexion, if present, may further irritate it. Clinically, patients initially complain of numbness and paresthesias in the little and ulnar half of the ring fingers. Pain over the medial aspects of the elbow and forearm, and tenderness in the tunnel are also present. As it progresses, weakness develops in the ulnar nerve distribution, resulting in loss of grip and pinch strengths, and clumsiness. Nerve conduction studies show slowing of motor and sensory nerve conduction velocities across the tunnel.

The neuropathy is treated conservatively or surgically. Conservative treatment has been indicated for patients with only mild sensory symptoms, and surgery for those with more severe sensory and motor deficits.[1-5] In our experience, however, some of such severely affected patients can be successfully managed by education, the simplest conservative treatment. This led us to reevaluate the effects of patient education and establish its indications. We included cubital tunnel syndrome and tardy ulnar palsy because these were often seen in our clinic.

METHODS

Participants

We included 80 nerves (cubital tunnel syndrome, 75; tardy ulnar palsy, 5) of 77 patients (56 men, 21 women). Patients consisted of 67 office workers (55 men, 12 women), 9 homemakers (women), and 1 retiree (man). Two men and 1 woman were bilaterally affected. We excluded those with an acute elbow injury or pressure palsy developed during unphysiologic (associated with alcohol, narcotics, or anesthesia) deep sleep, or who had been treated elsewhere. All the patients consented to the treatment protocol, which complied with the ethical standards of our institutional review board.

We established the diagnosis clinically and electrophysiologically. The clinical evaluation included checking for sensory involvement in the ulnar nerve distribution with the use of static 2-point discrimination and Semmes-Weinstein monofilament threshold tests in the little finger, and performing a

From the Departments of Rehabilitation Medicine (Nakamichi, Ida) and Orthopaedic Surgery (Tachibana, Yamamoto), Toranomon Hospital, Tokyo, Japan.

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Reprint requests to Kenichi Nakamichi, MD, Dept of Rehabilitation Medicine, Toranomon Hospital, 2-2-2 Toranomon, Minato-ku, Tokyo 105-8470, Japan, e-mail: *toranomonkajigaya@hotmail.com.*

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motor assessment by examination for muscle atrophy, performance of manual muscle tests, and measurement of grip and key-pinch strengths. Nerve conduction studies were performed independently at the Department of Neurophysiology. The diagnosis was mainly based on the American Association of Electrodiagnostic Medicine guidelines.[6] It was confirmed when at least 2 of the following criteria were met: (1) a motor nerve conduction velocity across a 10-cm cubital tunnel segment of less than 50m/s; (2) slowing in the velocity greater than 10m/s in the 10-cm segment than in the forearm; (3) a decrease in the negative peak amplitude of the compound muscle action potentials of the abductor digiti minimi across the tunnel of greater than 20%; and (4) a configuration change of the potential above the elbow compared with below the elbow. We always compared nerve conductions in the forearm, cubital tunnel, and arm, and confirmed that slowing occurred at the tunnel. Sensory nerve conduction was studied in an orthodromic fashion with the use of needle electrodes. Slowing in the conduction velocity across the tunnel (<50m/s) or polyphasic potentials above the elbow were considered abnormal even when the motor nerve results were normal.[7,8] When both motor (compound muscle action potentials of the abductor digiti minimi) and sensory responses were absent, we stimulated the nerve above the elbow and measured a motor nerve latency at the flexor carpi ulnaris (normal upper limit at our institute, 3.5ms) to confirm that the compression occurred at the tunnel. In addition, we always confirmed normal median nerve conduction.

Plain radiographs of the elbow (anteroposterior, lateral, and cubital tunnel projection) were made in all of the patients independently at the Department of Radiology.

Interventions

Our intervention was education alone. It consisted of a thorough explanation of the pathophysiology and activity modification. For the former, we explained to the patients that the disease was due to ulnar nerve compression or traction at the cubital tunnel and that the purpose of the education was to unload the nerve from mechanical stress. For the latter we told them to avoid the following: pressure on the medial aspect of the elbow; activities aggravating symptoms; repetitive flexion and extension; and flexion greater than 90° except for essential daily activities such as toothbrushing, combing, or bathing. We also explained that elbow flexion combined with wrist extension, overhead shoulder elevation, and contralateral head tilt or turning would further stretch the nerve.[3,9,10] We then recommended maintaining the elbow in 45° of flexion as long as possible to reduce the extraneural and intraneural pressures.[11] While the patient was sitting, the hand was placed on the thigh with the forearm in supination.[12,13] For computer keyboard use, the console and seat were repositioned. We used a goniometer set at 45° for the education on these postures. Patients who tended to sleep with their elbows flexed and experienced paresthesias at night or on awakening in the morning were advised to use a towel or bandage to restrict flexion. They also served as a reminder. To help them understand the activity modification and improve their compliance, we used an educational handout (fig 1).

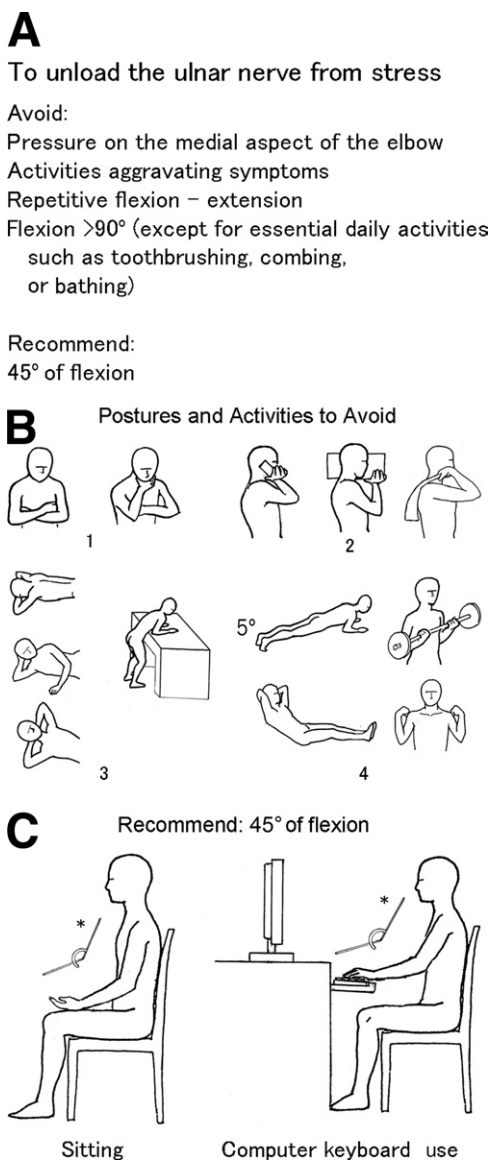

Fig 1. Handout for patient education. (A) Page 1 provides advice in writing. (B) Page 2 depicts activities and postures to avoid: (1) crossing arms over the body or reaching the neck or chin, especially while attending a meeting; (2) use of a phone (using the opposite hand, a headset, or shoulder cradle recommended) or carrying a box or bag with its straps on the shoulder; (3) lying with the elbows flexed or leaning upon them; and (4) push-ups, sit-ups, weightlifting, or other elbow exercises. (C) Page 3 shows examples (sitting and computer keyboard use) to maintain the elbow in 45° of flexion. A goniometer set at this angle (*) was used for the education.

Follow-Up Examination

The length of the treatment was at least 3 months. We advised the patients to strictly follow our instructions during this period and to get accustomed to the modified lifestyle.

We examined them every 3 or 4 weeks. If improvement was occurring, the follow-up was lengthened. We discontinued the treatment if the patient was unable to tolerate it or the symptoms were worsened at any intervals, or they remained unchanged at 3 months.

We followed all of the improved patients at least for 1 year after they reached a plateau of improvement to check for recurrence.

Data Analysis

At the initial examination we obtained the following data, considering their possible influences on outcome: age, sex, affected side (dominant or nondominant), duration of the dis-