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Clinical features affecting the patient-based outcome after minimal medial epicondylectomy for cubital tunnel syndrome

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Summary *Background:* Little information is currently available to analyze unsatisfactory surgical outcomes for cubital tunnel syndrome (CuTS). The aim of this study was to analyze the clinical features influencing patient-reported outcomes of minimal medial epicondylectomy for CuTS.
Methods: We evaluated 91 patients who underwent minimal medial epicondylectomy for CuTS using the grip strength; two-point discrimination; Disability of the Arm, Shoulder and Hand (DASH) questionnaire; and a satisfaction with treatment questionnaire for one year, postoperatively. The clinical features evaluated as prognostic indicators included age, gender, body mass index (BMI), smoking, alcohol consumption, comorbidities, hand dominance, work level, history of elbow trauma, elbow arthritis, elbow flexion contracture, duration of symptoms, and severity of disease.
Results: Grip strength, two-point discrimination, and DASH scores exhibited significant clinical improvements, with 77% (70/91) of patients satisfied with treatment. In terms of patient-reported disability, heavy smoking, elbow flexion contracture, and preoperative disease

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severity increased DASH scores at 1-year follow-up. However, only heavy smoking and elbow flexion contracture were associated with a higher likelihood of dissatisfaction with treatment.
Conclusions: Heavy smoking, elbow flexion contracture, and preoperative disease severity are associated with persistently increased disability after minimal medial epicondylectomy for CuTS. However, only heavy smoking and elbow flexion contracture were associated with a higher likelihood of dissatisfaction with the treatment.

Introduction

Cubital tunnel syndrome (CuTS) is the second most common nerve entrapment neuropathy in the upper extremity, and it is the most common neuropathy of the ulnar nerve.[1,2] The incidence is estimated at 25 cases per 100,000 person-years, thus affecting men twice as frequently as women.[2,3] Common pathogenetic mechanisms include intermittent traction when the ulnar nerve becomes fixed at a single or several points, which limits the free gliding of the nerve,[4] and the compression of the nerve at the cubital tunnel due to reactive changes at the medial collateral ligament, adhesions within the tunnel, hypertrophy of the surrounding musculature, or joint changes.[5] Patients complain of numbness or tingling in the little and ring fingers, and it may be accompanied by medial elbow pain, weakness of grip, and severe, irreversible muscle atrophy and hand contractures.[1,2] This condition significantly restricts the activities of daily life and occupation.[2]

Treatment for CuTS is controversial, and the surgical procedure that is performed generally depends on the surgeon's preference and experience. Various surgical options for patients who do not respond to nonoperative treatment include simple decompression of the ulnar nerve around the elbow,[3,6] medial epicondylectomy,[7,8] or anterior transposition of the ulnar nerve.[3,6,9] Recent literature has shown no difference in the treatment effectiveness between in situ decompression and transposition of the ulnar nerve, especially for the mild-to-moderate form of CuTS.[3,10,11] However, medial epicondylectomy or anterior transposition of the ulnar nerve can be considered in those with a severe stage of the disease, cubitus valgus, or nerve subluxation.[12–14] Medial epicondylectomy decompresses the cubital tunnel and allows a mini anterior transposition without excessive dissection and devascularization of the nerve.[15] To avoid potential complications of medial epicondylectomy, such as elbow instability, flexor-pronator weakness, and elbow flexion contracture, some authors have advocated partial or minimal epicondylectomy as the removal of less than 20% of the medial epicondyle.[7,8] Many studies using partial or minimal medial epicondylectomy have achieved 67% to 94% good to excellent results, and minimal epicondylectomy improves neurologic deficits even in patients with the severe form of CuTS.[16]

Little information is currently available to analyze unsatisfactory outcomes after minimal medial epicondylectomy for CuTS, and knowledge of these factors will help determine the proper indication and prognosis for minimal epicondylectomy for CuTS. The purpose of this study was to analyze the factors affecting treatment outcomes and prognosis of minimal medial epicondylectomy for CuTS. We hypothesized that certain demographic and clinical features are associated with unsatisfactory outcomes of the procedure.

Patients and methods

This study was conducted as a retrospective cohort study and reported according to the recommendations by the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) statement.[17] A total of 109 patients who had undergone minimal medial epicondylectomy and in situ decompression for CuTS between October 2009 and June 2016 were reviewed. The patients were diagnosed as having CuTS through a review of their history, physical examination, and electrophysiological diagnosis. Patients were excluded if they had a double crush lesion such as cervical radiculopathy and Guyon's canal syndrome, varus or valgus deformity of the elbow, worker's compensation, and previous surgery for CuTS. Accordingly, 99 (91%) patients were approached for the study. Of those, eight (8%) patients were lost to follow-up before 12 months (two patients moved, two declined follow-up for socioeconomic reasons [time and cost], one declined to attend further because he was no longer troubled by the disease, and the others did not respond to phone calls or letters), thus leaving 91 patients for analysis in this study. Their mean age was 45.6 years (range, 25–73 years), and 65% (59/91) of the patients were men. The average duration of the symptoms before surgery was 22 months (range, 3–120 months). The surgery was bilateral in 14% (13/91) of the patients. In patients with bilateral surgery, we included and evaluated the side with a more severe disease grade. Sixty elbows were on the dominant side. The minimum follow-up was 12 months (mean, 25 months; range, 12–70 months). This study was approved by our Institutional Review Board, and all participants provided written informed consent. This study did not require any deviation from the current clinical practice. It was conducted in accordance with the principles of research involving human patients as expressed in the Declaration of Helsinki (64th, 2013) and in compliance with Good Clinical Practice standards.

All patients had routine physical examinations including range of motion of the elbow, grip strength, and two-point discrimination. The range of motion of the elbow was evaluated by recording elbow flexion/extension with a standard goniometer. Grip strength (kgf) was measured using the Jamar Hand Dynamometer (Asimow Engineering, Los Angeles, CA) with the elbow flexed at 90° and the forearm in a

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