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ORIGINAL ARTICLE

Comparing the effectiveness of endoscopic carpal tunnel release between idiopathic and long-term hemodialysis patients

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Summary *Background:* Carpal tunnel syndrome (CTS) is recognized as an increasing morbidity in long-term hemodialysis patients. In general, the open method is the preferred technique of carpal tunnel release for most of the surgeons. Endoscopic carpal tunnel release (ECTR) is an alternative approach for idiopathic CTS, but its effectiveness for hemodialysis-related patients is still under dispute.
Objectives: The purpose of current study was to compare the effectiveness of ECTR in treating CTS between long-term hemodialysis patients and idiopathic patients.
Methods: From November 2008 to March 2011, we consecutively collected 26 patients with idiopathic CTS and 22 long-term hemodialysis patients with CTS by a single surgeon. All patients received ECTR for decompression of the median nerve. The effectiveness between the two groups of patients was analyzed by clinical observation, historical-objective scale, two kinds of self-administered questionnaires (QuickDASH and Boston carpal tunnel questionnaires), and objectively by electrophysiological evaluation preoperatively and 3 months postoperatively.
Results: With regard to the historical-objective scale, the hemodialysis group had significantly more severe grades than the idiopathic group in preoperative and postoperative evaluations. Both groups showed significant improvement after the ECTR. According to the self-administered questionnaire results, there was no significant difference of the effectiveness of ECTR between the groups. Hemodialysis-related CTS was found to have more advanced

Conflicts of interest: The authors declare no conflicts of interest.

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electrophysiologic findings, and no significant improvement of electrophysiologic grading can be recognized in this group of patients.
Conclusion: ECTR was effective in both groups of patients, but the severity of their preoperative status, especially with advanced involvement, may compromise the objective results. Although the results from the self-administered questionnaires and the electrophysiological findings were inconsistent in these hemodialysis-related patients, it is possible to have satisfactory results in symptoms and questionnaires but with the less satisfactory electrophysiological outcome.

1. Introduction

Carpal tunnel syndrome (CTS) is the most common compression neuropathy of the upper extremity, and it accounts for 90% of all entrapment neuropathies.[1,2] The typical symptoms of CTS include paresthesia, tingling sensation and/or pain on the palmar surface of the radial digits, and even motor weakness and signs of thenar muscle atrophy in an advanced disease.[1–3] From a recent review by the Bureau of Health Promotion Department of Health, Taiwan, R.O.C., the incidence and prevalence of hemodialysis patients increased annually in Taiwan.[4] Chronic renal failure has been recognized as one of the risk factors of CTS, and the risk increases annually in terms of duration of hemodialysis. Pathogenesis of the amyloid fibrils in the carpal tunnel was documented in 1986.[5] Investigations found that one-third of chronic hemodialysis patients suffered CTS after <4 years of dialysis, a percentage that increased remarkably after 5 years, and reached nearly 100% after 20 years.[6–8]

In general, most surgeons prefer an open carpal tunnel release (OCTR) for long-term hemodialysis patients. The disease complexity and its progressive process were the major concerns by the surgeons when choosing the surgical technique.[1–3,9,10] Nonetheless, OCTR may induce several morbidities, such as postoperative edema, bleeding, hypertrophic scar formation, infections, nerve injuries, and subsequently causes long periods of restriction of postoperative daily activities.[9–11] The first endoscopic carpal tunnel release (ECTR) was described by Okutsu et al in 1989,[12] and endoscopic decompression has been applied to idiopathic or any other secondary carpal tunnel syndrome ever since as a main competitor of the traditional OCTR procedure. Studies comparing OCTR and ECTR have generally concluded that, with its advantages of reduced scar pain, preservation of grip and pinch strength, and early return to work, ECTR is the beneficial application for CTS patients.[12–15] The effectiveness of both procedures in idiopathic CTS patients appears to be equivalent and thus the ECTR has become a popular alternative carpal tunnel release method.[16,17] However, there are not many reports discussing the efficacy of ECTR in terms of treating CTS patients with long-term hemodialysis.

The purpose of the current study was to compare the effectiveness of ECTR in treating CTS between long-term hemodialysis patients and idiopathic patients.

2. Materials and methods

The study was approved by the Institutional Review Board of Chang Gung Memorial Hospital, Taoyuan, Taiwan. From November 2008 to March 2011, we consecutively collected 26 patients with idiopathic CTS and 22 long-term hemodialysis patients with CTS by a single surgeon (Y.-T.L.).

2.1. Inclusion and exclusion criteria

We excluded patients with risk factors of diabetes mellitus, rheumatoid arthritis, gout, and hypothyroidism. Patients with a past history of hand and wrist trauma were also excluded. Most of the patients were referred by neurologists. The diagnosis of CTS was mainly established by the typical signs and symptoms. Electrophysiology study was arranged for every patient pre- and postoperatively.

2.2. Surgical indications

The surgical indications are based on the patient's occupation, severity of clinical symptoms, advanced disease by nerve conduction tests, electrodiagnostic evidence of axon degeneration of the abductor pollicis brevis muscle, or a combination of these elements.

2.3. Operative procedures

We used the CTS Relief Kit (ConMed Linvatec Biomaterials, Largo, FL, USA) and a 2.7-mm video assisted 0° endoscope for single portal ECTR (Menon's technique).[18] All surgeries were performed on an outpatient basis. The patient was placed in a supine position with the upper limb abducted on a hand table. Local anesthesia with 1% lidocaine was used to infiltrate the operative field. When there was an arteriovenous fistula on the distal forearm and a rubber tourniquet could not be applied, diluted epinephrine (1:100,000) was added into the narcotics. For idiopathic patients, a rubber tourniquet was applied before incision. A 1-cm incision was made around the distal forearm crease ulnarly to the palmaris longus tendon. The incision was deepened to the antebrachial fascia. A small window was opened on the fascia. A freer was used to sound the carpal tunnel. Dilators of 5.5 mm and 7 mm were used to enlarge the carpal tunnel. A grooved cannula was then introduced