EDITOR'S CHOICE

Outcome of Carpal Tunnel Release and the Relation With Depression

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Purpose To examine the relation between depressive symptoms and outcome of carpal tunnel release (CTR).

Methods Prospective study in a general hospital with data collection at baseline and 3 and 12 months after CTR. We quantified depressive symptoms using the Center for Epidemiologic Studies Depression (CES-D) scale and performed multivariable analyses on 2 outcome measures: (1) carpal tunnel syndrome (CTS) symptoms (Boston Carpal Tunnel Questionnaire [BCTQ]) and (2) palmar pain, focusing on preoperative CES-D and BCTQ score, sex, age, alcohol use, diabetes, and severity of nerve conduction abnormalities.

Results We included 227 patients. Before surgery, patients with depression had a higher BCTQ score than patients without depression. After 1 year, depressed patients had a higher BCTQ score and more palmar pain. The CES-D decreased by a median of 2 points from baseline to 1 year. This correlated with the decrease in BCTQ score. Multivariable analyses showed that preoperative depression had a small but statistically significant influence on palmar pain, but not on postoperative BCTQ score.

Conclusions Depression is not an independent predictor of residual CTS symptoms 1 year after CTR. Depressive symptoms in patients with CTS decrease after CTR, along with a decrease in CTS symptoms. The nature of this relationship is unknown. Patients with CTS and depression may expect a somewhat higher degree of palmar pain after CTR, the clinical relevance of which is small. *(J Hand Surg Am. 2017;■(■):■−■.*

Type of study/level of evidence Prognostic II.

Key words Carpal tunnel syndrome, carpal tunnel release, depression, palmar pain.

Depression and chronic pain commonly occur together as mutually reinforcing conditions.[1] This co-occurrence has important consequences because assessing the success of surgical treatment can be complicated by the presence of concomitant depressive symptoms.[2] Preoperative depression has been shown to be an independent predictor of postoperative persistence of pain after knee arthroplasty,[3] lumbar spinal stenosis surgery,[4] and lumbar discectomy.[5]

In carpal tunnel syndrome (CTS), the relation between depressive symptoms and the outcome of surgery is of particular interest because depression and CTS are both highly prevalent conditions, specifically among women.[6,7] Although surgical carpal tunnel release (CTR) has a good to excellent outcome in 70% to 90% of patients,[8–10] because of the high prevalence of CTS, the absolute number of patients with a poor outcome is still substantial.[7] An

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unfavorable outcome can be due to persistent or recurrent symptoms of CTS or to pain related to the surgical scar.[11] The relationship between depression and the outcome of CTR is not well understood. Whereas some studies have reported no effect of depression on the outcome of treatment of CTS,[12,13] others stated that depression affects scar pain[14] or patient satisfaction and perceived disability.[15,16] These seemingly conflicting results are probably caused by differences in study designs, small samples,[13,15] and relatively short follow-up.[12,14]

We therefore conducted a prospective, observational study to explore the results of CTR in both depressed and nondepressed patients and to determine the relation between depression and the results of CTR. We used 2 established outcome measures: (1) residual CTS symptoms and (2) postoperative palmar pain. Additional factors that may affect the outcome of CTR include age, sex, diabetes mellitus, alcohol use, severity of CTS symptoms, and severity of nerve conduction studies (NCS) abnormalities.[12–20] Hence, these factors were analyzed to study their individual influence on surgical outcome and to adjust for their potential confounding effect.

METHODS

Design, setting, and participants

This design was a prospective observational study in the general care setting of the Alrijne Hospital in Leiden, the Netherlands. All adult patients scheduled for CTR were eligible for participation, except for patients undergoing revision surgery. Carpal tunnel release was performed if both clinical symptoms and NCS were consistent with CTS. The clinical diagnosis was made by 1 of 4 experienced neurologists and was based on typical signs and symptoms; tingling sensations, numbness or pain in the palm of the hand and fingers, nocturnal tingling, numbness or pain in the hand, shaking the hand to relieve the symptoms (the Flick sign) and loss of dexterity. The electrophysiological diagnosis was based on the CTS guidelines of the Dutch Society of Neurology.[21] This guideline recommends the use of 3 sensory nerve conduction tests.[21] In addition, we compared the median and ulnar motor nerve distal latencies. When at least 2 of these 4 tests were indicative of nerve conduction slowing at the carpal tunnel, we considered the NCS to support the diagnosis CTS. All measurements were performed with a hand temperature of at least 30°C. In case of bilateral CTR, the hand with the most severe symptoms was operated first and the interval between surgery of the 2 sides generally was no longer than 3 months. We included only data concerning the first CTR of these patients. Between March 2012 and July 2014, eligible patients were asked to participate in the study by a research nurse who was present only some days of the week. The study was approved by the medical ethics committee of Leiden University Medical Centre. All participants provided written informed consent. Procedures followed were in accordance with the Fortaleza Declaration of 2013.

Measurements

The following baseline variables were recorded: sex, age, the presence of diabetes mellitus, assessed by the use of antidiabetic medication, and alcohol intake, expressed in number of units per week.

Nerve conduction studies were performed in all cases. We selected the difference between sensory nerve conduction velocity (CV) of the ulnar and median nerve after stimulation at the level of the wrist and recording at the fourth digit as a marker for the severity of NCS abnormalities.[22] The results were divided into 3 categories: mild (CV difference between ulnar and median nerve < 10 m/s), moderate (CV difference ≥ 10 and < 20 m/s), or severe (difference > 20 m/s or sensory nerve action potentials of the median nerve absent).

Patients filled out questionnaires at 3 points in time: within 2 weeks prior to surgery, 3 months after surgery $\pm$ 2 weeks, and 1 year after surgery $\pm$ 4 weeks. The first questionnaires were filled out by the patient together with a trained research nurse. The postoperative questionnaires were self-administered.

Carpal tunnel syndrome symptoms were measured using the first part of the Boston Carpal Tunnel Questionnaire (BCTQ), which includes 11 questions concerning severity, frequency, and duration of pain and tingling at night and during the daytime, numbness, and loss of dexterity. Each question provides 5 response choices, from 1 (no symptoms) to 5 (most severe/often); the mean of 11 responses is calculated as the BCTQ score, ranging from 1 to 5.[23] Depressive symptoms were quantified using the Center for Epidemiologic Studies Depression Scale (CES-D), a commonly used validated questionnaire based on the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition.[24] The 20 items on this questionnaire measure various aspects of depression such as depressed mood and feelings of worthlessness and helplessness. Each item has 4 response choices, from 0 to 3, quantifying depressive symptoms over the past week. The scores range from 0 to 60, with a higher