

Does the dominant hand factor have an effect on postoperative recovery in the surgical treatment of carpal tunnel syndrome?

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Abstract

Objective: Carpal Tunnel Syndrome (CTS) is the most frequently encountered entrapment neuropathy. Surgical treatment is usually suggested to patients with severe symptoms. In this study, we aimed to examine the effect of the dominant hand on the clinical results of CTS decompression surgery.

Methods: Fifty (5M, 45F) patients were included in the study. The Edinburgh Handedness Inventory was used to identify the dominant hand of patients included in the study. Visual analogue scale (VAS) values were evaluated pre- and postoperatively.

Results: Twenty-eight patients underwent surgery on the dominant hand and 22 patients had surgery to their non-dominant hand. The VAS values of patients who underwent non-dominant hand surgery were lower than those who underwent surgery on the dominant hand.

Conclusion: In our study, it was determined that patient complacency after surgical procedures performed on dominant hands was less when compared with the non-dominant side. We believe that suitable exercise and protection programs for dominant hands in the postoperative period of carpal tunnel surgery, in addition to a good and careful surgical technique, positively affects the results of surgical treatment.

Keywords: Carpal tunnel syndrome, dominant hand, surgical treatment, recovery

INTRODUCTION

Carpal tunnel syndrome (CTS) is a condition caused by acute or chronic compression of the median nerve while passing through the carpal tunnel (1). The incidence is higher in females, and its frequency increases with age (2). The clinical symptoms of CTS include pain, weakness, and paraesthesia in the distribution trace of the median nerve. Furthermore, hand strength decreases and hand function is diminished (3). Diabetes mellitus, thyroid dysfunction, pregnancy, obesity, fractures in the wrist, rheumatoid arthritis, osteoarthritis, and repetitive use of the dominant hand in daily activities increase the risk of CTS (4, 5). Environmental factors include strong hand movements, irregular and stretched positions of the wrists in extreme elastic flexion or extension, constant repetitive use of flexor muscle groups, and exposure to vibration; the effect of these environmental factors is observed more in the dominant hand (6). In this study, we aimed to examine the effect of dominant hand factor on the clinical results of CTS decompression surgery.

METHODS

This study was approved by Başkent University Medicine and Health Sciences Research Board (Project no: KA17/122) and was supported by Başkent University Research Fund. Fifty patients with CTS who underwent minimally invasive surgery at Başkent University, Faculty of Medicine, Adana Training Research Centre of Neurosurgery between 2011 and 2016 were included in our study. Surgical consent was obtained from all patients before surgery. Data were examined retrospectively. Patients who were aged below 40 years, those with a history of polyneuropathy, rheumatoid arthritis, and previous wrist fractures were excluded from the study. All patients who underwent surgery had

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serious symptomatic and electrodiagnostic findings (distal latency > 5msn). The symptoms of all patients were present for at least for 1 year. The Edinburgh Handedness Inventory (EHI) was used to determine the dominant hand of the patients (7). All patients underwent minimally invasive surgery under local anesthesia.

The visual analog scores (VAS) of all patients were evaluated in terms of preoperative and postoperative subjective symptoms obtained in the 1st year. The presence or absence of nocturnal pain and paresthesia was also evaluated. The data were analyzed statistically by an independent statistician using the Chi-square and t-tests. P<0.05 was considered statistically significant.

RESULTS

In total, 50 patients were included in the study. The number of patients who underwent surgery on the dominant hand (group 1) was 28, 22 (78.6%) of whom were women and 6 (21.4%) were men. The average age in group 1 was 57.1 years (range, 40-80 years). The number of the patients who underwent surgery on the non-dominant hand (group 2) was 22, 15 (68.2%) of whom were women and 7 (31.8%) were men. The age average in group 2 was 54.4 years (range, 40-79 years).

Left-hand dominance was determined in 2 patients (7.1%) in group 1 according to data obtained using the EHI. In group 2, left-hand dominance was determined in 1 patient (4.5%). The demographic data of the patient groups are presented in Table 1.

In both groups, significant improvement was ensured sta-

tistically in the postoperative symptoms obtained in terms of preoperative and postoperative symptoms (paraesthesia, pain, and night pain) (p<0.05). Paraesthesia and night pain were present in all patients in both groups in the preoperative period.

In the 1st year postoperative follow-ups, the paraesthesia rate was 32.1% in patients in group 1, whereas it was 13.6% in group 2. The rate of night pain was 21.6% for group 1, and was 13.6% for group 2.

Better results were obtained for these two symptoms in patients who underwent surgery on the proportionally distinct non-dominant side. The average preoperative VAS score was 9.07 for group 1, and was 1.89 in the postoperative 1st-year follow-up. The average preoperative VAS score for group 2 was 9.18, and was 0.91 in the postoperative 1st-year follow-up. When the postoperative VAS score averages of both groups were compared, the results of group 2 were much better; however, the difference was not statistically significant (p>0.05, Table 2).

DISCUSSION

Carpal tunnel syndrome is observed more frequently in the dominantly used hand and in women (8). In the literature, the female/male ratio varies between 1.8/1 and 10/1. It is observed more frequently in the 5th and 6th decades (9). The results obtained from our study were compatible with these epidemiologic data.

In the development of CTS, intense use of the dominant hand in daily activities can be accepted to be the basic cause (10). It was accepted that excessive use of hands, occupational causes, and repetitive trauma were the most frequently encountered causes in many patients (11). In a study performed with 169 patients, Reinstein emphasized that CTS emerged more frequently in the dominant hand in both right-and left-handed patients (1). In the recent study of Zambelis et al., similar results were obtained (12). In our study, similar numbers of patients from both groups were included in the study because it was desired to compare the results of patients who underwent surgery on the dominant and non-dominant hand. Upon evaluation of the obtained data, the results from the dominant hand in the postoperative 1st year were worse when compared with the non-dominant hand, and we concluded that hand dominance was a risk factor in terms of slow or delayed healing.

Table 1. Demographic characteristics of the patients

	Group 1 (Patients operated on the dominant hand) n=28	Group 2 (Patients operated on the non-dominant hand) n=22
Average age	57.1 (40-80)	54.4 (40-79)
Sex		
Female	22 (78.6%)	15 (68.2%)
Male	6 (21.4%)	7 (31.8%)
Operation side		
Right	26 (92.9%)	1 (95.5%)
Left	2 (7.1%)	21 (4.5%)

Table 2. Comparison of the data obtained for the groups

	Preoperative VAS	Postoperative VAS	Postoperative night pain	Postoperative paraesthesia
Group 1	9.07	1.89	6/28 (21.4%)	9/28 (32.1%)
Group 2	9.18	0.91	3/22 (13.6%)	3/22 (13.6%)

VAS: visual analogue scale

We cannot speculate about relapse because we did not obtain postoperative electrophysiologic studies in our research, which is a weakness of our study.

Accordingly, postoperative VAS score worsening cannot be based upon electrophysiologic studies. We did not assess the association between surgical results and electrophysiologic findings in our study.

In a previous study, the risk of right CTS development was 5 times more in patients with the right hand dominance, and the risk of left CTS development was 13 times greater in the patients with left hand dominance (12). Major correlations have been established between the dominant hand and CTS development in the literature (10, 11). Our data support this literature information. The application of postoperative rehabilitation was reported to deliver distinctively good results (13). In the present study, the results obtained for the dominant hand in the postoperative period suggest a risk of delayed healing due to the more frequent use of the extremity and a suitable rehabilitation program was necessary. The average postoperative VAS scores in the non-dominant hand group were significantly better. However, in order to confirm the validity of our data, longer-term studies with a larger patient numbers are needed.

To conclude, our results imply a risk slow or delayed healing for the dominant hand in the postoperative period owing to frequent use of the extremity. We believe that, in addition to good and careful carpal tunnel surgical technique, a suitable exercise and protection program for the dominant hand in the postoperative period will positively affect the results of surgical treatment.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Başkent University Medicine and Health Sciences Research Board/ KA17/122.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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