



A Brief Review of Recent Advances in Carpal Tunnel Syndrome

Farhad Mirzaei¹, Morteza Delkhosh Reihani², Firooz Salehpour¹, Marzieh Marahem^{3*}

Abstract

Objectives: Carpal tunnel syndrome (CTS) is a complicated disorder which occurs when a localized median nerve is compressed in the carpal tunnel. It causes neurological symptoms, pain, and functional limitation of the wrist, which in turn leads to problems in daily routines and activities and reduced ability to work, ultimately negatively affecting the quality of life and public health status. In this regard, this review aimed to evaluate the effective diagnosis and conservative treatments of CTS.

Materials and Methods: To conduct this review study, Google Scholar, PubMed, and Elsevier databases were searched using the keywords “carpal tunnel syndrome, treatment outcome, review, corticosteroids, and diagnosis”. At last, 40 articles were selected and fully reviewed.

Results: Our results were obtained based on the results of the reviewed articles. Therefore, local and oral corticosteroid, splint, physical examination, and reported outcomes in surgeries revealed the effective diagnosis and conservative treatments in CTS.

Conclusions: Based on the results, the CTS diagnosis should be based on the medical history of patient. In addition, physical examination must be done along with electrodiagnostic test. To reduce the signs and symptoms of moderate CTS, the use of local and oral corticosteroid could be effective according to the evidence. Only in some limited conflicting evidence, it was observed that nonsteroidal anti-inflammatory drugs, vitamin B6, and diuretics were no more effective than placebo in relieving the CTS symptoms. Therefore, surgery may be the sole treatment that takes away the median nerve compression in moderately severe cases.

Keywords: Carpal tunnel syndrome (CTS), Treatment outcome, Corticosteroids, Diagnosis

Context

Carpal tunnel syndrome (CTS) is a complex disorder with local compression of the median nerve in the carpal tunnel (1,2). The term “carpal tunnel syndrome” was first published by Kremer in 1953 (3). This disease, with the compression of one of the median nerves to the hand, causes symptoms like nerve pain and functional limitation of the wrists, and leads to problems in daily routines and reduction of the ability to work, by affecting the quality of life and general health (4,5). The disease is more common in middle-aged individuals between the ages 30 and 60. More severe clinical and electrophysiological symptoms of median nerve compression may be seen in the elderly (6,7). The most typical symptoms are pain, feeling of hand falling asleep, paresthesia, and numbness (8,9), and its diagnosis is based on the medical history, physical examination, and electrodiagnostic test (1,10). Most cases of CTS are idiopathic or caused by congenital anomalies, and some focal or systemic diseases such as wrist injury, arthritis, diabetes, thyroid disease, rheumatoid arthritis, and pregnancy can increase median nerve compression in the carpal tunnel and help develop CTS (11,12). Recent evidence highlights that there is high prevalence of CTS in Iran (13). Hence, this review intended to evaluate the effective diagnosis and conservative treatments that can

help in choosing the appropriate therapies and clinical tests for CTS.

Evidence Acquisition

To conduct the study, Google Scholar, PubMed, and Elsevier databases were searched using the keywords “carpal tunnel syndrome, treatment outcome, review, corticosteroids, and diagnosis”. At last, 40 articles were selected.

Results

The results of this review included were categorized into 2 classes: effective diagnosis and treatment.

Effective diagnosis in Carpal Tunnel Syndrome

Medical History

The results of reviewed articles showed that patients might complain of a sense of swelling in their hands. Feeling of hand falling asleep was an early symptom. Moreover, paresthesia occurred when the hands were shaken out. Numbness and tingling were the late symptoms (14,15).

Physical Examination

Clinical tests such as Phalen’s and Tinel’s sign tests were developed to evoke symptoms with passive compression

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¹Department of Neurosurgery, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran. ²Fellowship of Pain and Palliative Medicine, Tabriz University of Medical Sciences, Tabriz, Iran. ³Department of Physiology, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

*Corresponding Author: Marzieh Marahem, Tel: +989148929418, Email: m.marahem@yahoo.com



of the median nerve and were commonly used for the detection of nerve pathologies (1,16,17).

Imaging

Electromyography and nerve conduction study can confirm the diagnosis (18,19), determine the possible severity of nerve injury, measure and guide the effects of the treatment, and rule out diseases, such as radiculopathy and brachial plexus (20). The diagnosis is achieved by electrodiagnostic tests or electromyography, which is used to investigate the speed of neural conduction in the electrodes placed on the patient's hands and wrists (21,22). To this end, a few small electric shocks are established in the place, where the speed of transmission of messages is measured by the nerves. Therefore, the severity of the injury to the medial nerve can be determined. Ultrasound scan and visualization of median nerve enlargement may help the diagnosis process (23). Ultrasound scan may typically show flattening of the nerve inside the tunnel and enlargement of the proximal and distal nerves to the tunnel (24). Apparently, recent studies may confirm that transverse plane ultrasound of the median nerve cannot replace the electrodiagnostic test for the detection of CTS, but can provide complementary results. Therefore, ultrasound scan should be considered in suspicious or secondary CTS cases (25). Several studies support that ultrasound therapy produces desired results than laser therapy (26,27) while other studies report contradictory results (9,28). Furthermore, wrist radiography may be useful in case of suspected fracture or degenerative joint disease (29).

Treatment

Splinting

According to some studies, splinting is known as the first line of non-surgical treatments and may help completely reduce or relieve the symptoms of CTS. Nonetheless, there is evidence that in initial splinting, if the symptoms were not relieved, further splinting should be discontinued (1,30,31).

Local Corticosteroid Injections

Out of the articles reviewed in this study, 6 were of high quality. There was strong evidence that local corticosteroid injection is considered a common primary care intervention, which provides symptomatic relief from three months to one year (32,33). It may also defer the need of patients with mild to moderate CTS for surgery (8,34,35). Local anesthesia is fast, safe, and effective, and leads to a reduction in invasive procedures, hospital stay, and related costs (36).

Oral Corticosteroid

There was strong evidence that oral corticosteroid can be effective for short-term management of CTS and has been widely used; However, there is limited clinical evidence on

their role in treating physical problems. Recent systematic reviews have demonstrated that the use of oral medication such as nonsteroidal, anti-inflammatory drugs, vitamin B6, and diuretics are no more effective than placebo in relieving the CTS symptoms (8,37,38).

Surgery

Relevant studies have shown that surgery can provide better relief than repeat injections or splint, and to make a decision whether to have surgery may take place after a long period of non-surgical treatment and sever symptoms (39-43).

Conclusions

Based on our brief review, it seems the diagnosis of CTS should be based on the medical history of the patient, and physical examination must be done along with electrodiagnostic test. To reduce the signs and symptoms of moderate CTS, the use of local and oral corticosteroid could be effective according to the evidence. Only some limited conflicting evidence have shown that nonsteroidal anti-inflammatory drugs, vitamin B6, and diuretics are no more effective than placebo in relieving the CTS symptoms. Therefore, surgery may be the sole treatment that takes away the median nerve compression in moderately severe cases.

Conflict of Interests

Authors have no conflict of interests.

Ethical Issues

Not applicable.

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