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REVIEW ARTICLE

Clinical Course and Prognostic Factors in Conservatively Managed Carpal Tunnel Syndrome: A Systematic Review

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Abstract

Objective: To summarize the available evidence regarding the course of symptoms and prognostic factors in patients with diagnosed carpal tunnel syndrome (CTS) who are treated conservatively.

Data Sources: Computerized databases, reference checking, and experts in the field were used to identify studies for inclusion in the review.

Study Selection: Multiple reviewers were used to identify studies which included adults (aged ≥18y) diagnosed with CTS in either a clinical setting or population setting. The study must have observed the course of CTS over at least a 6-week period in patients receiving no treatment or usual care that included conservative (nonsurgical) treatments. The design was of a longitudinal cohort study with either prospective or retrospective data collection. There were no language restrictions, and none of the research identified was only reported in abstract form.

Data Extraction: Methodological bias was assessed using the Quality in Prognosis Studies tool. A high risk of bias (predominantly relating to study attrition, confounding, and/or statistical analysis and reporting) was judged to be present in 8 studies. Designs showed wide variability with respect to characteristics of the included population, definition of CTS, assessment of prognostic factors, types of interventions provided, and types of outcome measures applied. This prevented pooled estimates from being produced.

Data Synthesis: A negative outcome at 3 years' follow-up of conservatively treated participants ranged from 23% to 89%. Four included studies observed the rate of surgical intervention after initial conservative management and found this to be 57% to 66%. Evidence regarding factors predicting the negative outcome of no treatment or conservative treatment was graded, taking into account the number of studies evaluating the factor, the methodological quality of these studies, and the consistency of the available evidence. There was 100% agreement in at least 3 cohorts with a medium or high risk of bias that symptom duration, a positive Phalen's test, and thenar wasting were associated with a negative outcome of conservative management; however, not all results were statistically significant, and hence the overall judgment remained inconclusive.

Conclusions: Results of this review should be treated with caution because of the heterogeneity of studies and the risks of bias identified. However, the course of CTS appears variable, and poor prognosis may be predicted by a longer symptom duration, a positive Phalen's test, and thenar wasting.
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Carpal tunnel syndrome (CTS) is a chronic focal compressive neuropathy caused by the entrapment of the median nerve at the level of the carpal tunnel.[1] CTS is the most common of the entrapment neuropathies, accounting for 90% of presentations,[2] and is characterized by numbness, tingling, hand and arm pain, and muscle dysfunction.[3] Between 55% and 65% of CTS cases present bilaterally,[4] and the condition can be associated with hypothyroidism, diabetes, and rheumatoid arthritis, among others. CTS may present in late pregnancy but is usually transient.

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Studies in different countries have reported varying results with respect to the incidence of CTS.[5] A survey of the Skåne Health Care Register in Sweden by Atroshi et al[5] was age adjusted to the 2000 U.S. standard population to allow comparison with the results of a U.S.-based survey of the Rochester Epidemiology Project.[6] The estimated incidence of CTS in Sweden was reported as 324 per 100,000 in women compared with 542 per 100,000 in the United States, and in men, 166 per 100,000 in Sweden compared with 303 in the United States.[5,6] The explanation for variation between countries is unknown; however, suggested possibilities include differences in health care–seeking behavior and variation in etiologic factors including occupation, diabetes, and inflammatory joint disease.[5]

The treatment of CTS is often categorized as either surgical or conservative (nonsurgical). Surgical treatment is generally recommended for those with severe CTS (ie, evidence of denervation of the median nerve), while conservative treatments are recommended for the initial management of those who have intermittent or mild symptoms or in whom surgery is contraindicated.[7] The U.S. standardized annual incidence of carpal tunnel release surgery per 100,000 persons was 166 in Sweden compared with 171 in the United States and, among men, 58 in Sweden compared with 96 in the United States.[5,6] Examples of conservative treatment include oral steroids, steroid injections, physical therapy, electrotherapy, night splinting, and workplace alterations.[8] In United Kingdom primary care, steroid injections and night splinting form the mainstay of conservative treatment options, as indicated by national care pathways (eg, National Institute for Health and Care Excellence Clinical Knowledge Summaries).[9,10] Guidelines for the management of CTS by the American Association of Orthopaedic Surgeons[11] conclude that patients with more severe and prolonged CTS may not benefit from extended conservative treatment. However, the authors were unable to recommend in which patients conservative treatments were unlikely to be effective.[11]

Cochrane systematic reviews of conservative treatments for CTS[12] have included the assessment of local corticosteroid injections[13] and splinting.[7] With respect to splinting, the authors conclude that there is limited evidence that night splinting is more effective than no treatment in the short-term. They do, however, suggest that more research is needed on the long-term effects of this intervention.[7] With regard to steroid injections, it was concluded that robust evidence demonstrates clinical improvement up to 1 month compared with placebo, but relief beyond this period has not yet been shown.[13]

With ongoing clinical uncertainty regarding the most effective management strategy for CTS, there is a clear need for a greater understanding of the likely long-term course of CTS symptoms (overall prognosis) of the condition and patient factors that may be associated with outcome (prognostic factors).

Outcomes and predictors of surgical outcome have been well reported in the literature. However, few studies and no systematic reviews have been performed to summarize the evidence for prognosis and prognostic factors in conservatively managed disease—that is, that which can be delivered in a primary care environment. An estimate of average prognosis is required by public health policymakers in order for the population burden of a condition to be assessed. Understanding the future outcomes of patients with a particular condition in relation to current practice and even in the absence of clinical care (the natural history) is crucial because it allows the potential impact of interventions to be more fully assessed.[14] Such information is not only important when considering the potential benefits of interventions, but also in order to inform patients, clinicians, and policymakers of the potential harms, variations (such as underuse, overuse, misuse), and potential impact on health care efficiencies.[14]

This systematic review and narrative synthesis initially focuses on summarizing the prognosis research regarding the general course of CTS. The "start point" of this review will be the point of diagnosis of CTS that is being treated conservatively or with no clinical treatment. The "endpoint" will vary depending on the primary study. This synthesis therefore seeks to describe the course of CTS being managed either with no intervention or with conservative approaches.

The second part of this systematic review aims to identify predictors of long-term outcome (prognostic factors) in CTS. A prognostic factor is "any measure that, among people with a given health condition (start point), is associated with a subsequent clinical outcome (endpoint)."[15(p1)] Prognostic factor research thus seeks to identify the predictive value of such factors.

Research of prognostic factors aims to identify features that could potentially contribute to the development of prognostic models or represent predictors of differential treatment response, which may further contribute to a stratified care approach to a condition. Prognostic factors may also represent modifiable targets for interventions and could hence lead to the development of new management strategies through an improved understanding of disease mechanisms.[15]

List of abbreviations:

CTS carpal tunnel syndrome
QUIPS Quality in Prognosis Studies

Methods

Identification and selection of literature

Details of the protocol for this systematic review were registered on PROSPERO (CRD42013006608) and can be accessed at http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42013006608#.VYk_RflVhBc. Eligible publications had to report the course of CTS symptoms (persistence/recovery or severity of pain or other symptoms) and/or the association between a potential prognostic factor and outcome, as well as meeting the following eligibility criteria: (1) The study included adults (aged ≥18y) diagnosed with CTS in either a clinical setting or population setting. Studies in pregnant women and in populations such as specific occupational groups were excluded. (2) The study observed the course of CTS over at least a 6-week period in patients receiving no treatment or usual care that included conservative (nonsurgical) treatments. Studies reporting risk factors for onset of CTS as opposed to predictors of outcome were excluded, as were studies investigating predictors of the effectiveness of a specific treatment (which would ideally require a review of randomized controlled trials and is planned for the future). (3) The design was of a longitudinal cohort study with either prospective or retrospective data collection. (4) There were no language restrictions, and none of the research identified was only reported in abstract form.