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ORIGINAL ARTICLE/ARTICLE ORIGINAL

The relationship of pre- and postoperative median and ulnar nerve conduction measures to a self-administered questionnaire in carpal tunnel syndrome

Relation entre les mesures pré- et postopératoires des conductions des nerfs médians et cubitaux et les questionnaires d'autoévaluation dans le syndrome du canal carpien

T.P. Green[a], E.U. Tolonen[b], M.R.A. Clarke[a], P. Pathak[a], M.L. Newey[a], C.J. Kershaw[a], M.A. Kallio[b,*]

[a] *Department of Orthopaedics, Leicester General Hospital, Leicester, United Kingdom*
[b] *Department of Clinical Neurophysiology, Oulu University Hospital, P.O. Box 50, 90029 OYS, Oulu, Finland*

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KEYWORDS
Carpal Tunnel Release;
Carpal Tunnel Syndrome;
Nerve Conduction studies;
Hand-held device;
Boston Questionnaire

Summary
Study aims. — Following carpal tunnel release (CTR), only very modest correlations have been found between subjective symptoms and function indexes compared to neurophysiological measures. The objective of this study was to evaluate this relationship by comparing the self-administered Boston symptom severity score and function severity score questionnaire against nerve conduction studies (NCS) before and after CTR using two different electrophysiological techniques.
Patients and methods. — Carpal tunnel release was performed in 51 patients (62 hands). Pre- and postoperative NCS were evaluated using both conventional neurophysiological methods and by means of a new hand-held device.
Results. — Preoperatively there was almost no correlation between symptom severity and function scores and NCS results. Following surgery however, both symptom severity and function showed a modest, but significant improvement in their correlation to NCS (at highest $r = 0.405$, $P < 0.01$). This improvement in the relation of subjective measures to neurophysiological results was seen in both median nerve sensory and motor conduction as well as in ulnar nerve motor conduction.

* Corresponding author.
E-mail address: mika.kallio@oulu.fi (M.A. Kallio).

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Conclusions. — In addition to median-nerve dysfunction, it might be suggested that ulnar nerve changes can contribute to symptoms of carpal tunnel syndrome in patients. Several associations were found using a median-ulnar sensory latency difference in the finger-wrist segment and a sensory conduction difference in the palm to wrist segment. Significant correlations were established by both conventional NCS and the new hand-held device.

MOTS CLÉS
Neurolyse du nerf médian ;
Syndrome du canal carpien ;
Neurographie ;
Boston Questionnaire

Résumé
Objectifs de l'étude. — Suite à une libération du canal carpien (CTR), seules des corrélations très modestes ont été constatées entre les symptômes subjectifs et les indices fonctionnels, d'une part, les mesures neurophysiologiques, d'autre part. L'objectif de cette étude était de mieux évaluer cette relation en comparant l'autoévaluation du score de sévérité des symptômes de Boston (BQSS) et le questionnaire du score de sévérité fonctionnel (BQFS) avec les études de conduction du nerf (NCS).
Patients et méthodes. — Des NCS ont été réalisées avant et après une CTR chez 51 patients. Nous avons comparé les méthodes traditionnelles de mesure et les mesures de conductions nerveuses avec celles obtenues en utilisant un nouveau dispositif portatif.
Résultats. — Avant l'intervention, il n'y avait presque pas de corrélation entre les scores BQSS et FS et les résultats de la NCS. Cependant, après intervention, les BQSS et FS ont connu une amélioration modeste mais significative dans leur corrélation avec la NCS (au maximum $r = 0405$, $p < 0{,}01$). Cette amélioration de la relation entre les mesures subjectives et les résultats neurophysiologiques a été constatée à la fois au niveau des conductions sensitives et motrices du nerf médian et des conductions motrices du nerf cubital.
Conclusions. — Nos résultats suggèrent qu'outre un dysfonctionnement du nerf médian, des altérations fonctionnelles du nerf cubital pourraient mener aux symptômes du syndrome du canal carpien. Plusieurs associations ont été trouvées en mesurant la différence de latence sensitive médian/cubital dans le segment poignet-doigts ainsi qu'une différence de conduction sensorielle dans le segment paume-poignet. Ces corrélations ont été établies aussi bien par les méthodes traditionnelles de NCS qu'en utilisant le nouveau dispositif portatif.

Introduction

Median-nerve conduction studies (NCS) significantly improve in relation to baseline after carpal tunnel release (CTR) [16,27]. It is recognised in many patients with carpal tunnel syndrome (CTS) that, in addition to the median nerve distribution, the area innervated by the ulnar nerve may also exhibit paraesthesias [6]. In CTS, damage to ulnar-nerve sensory axons in Guyon's canal is also found [6]. Moreover, a recent report demonstrated an improvement in ulnar sensory conduction values after operation [19]. These ulnar nerve conduction disturbances become evident with increasing severity of CTS [6]. In CTS mild ulnar-nerve motor conduction disturbances have previously been described [5,28], though not in all studies [7].

In addition to NCS, several self-administered questionnaires such as the Boston questionnaire (BQ) have been used for the assessment of severity of symptoms and functional status. These have also been used to assess the results of surgery [16,27,12,14]. After surgery there is a significant improvement in the BQ scores [16,27,17,18]. The correlation between the NCS and the questionnaire score has, however, been often absent or modest at best [16,27,17,24]. It may be that the BQ and the NCS reflect different aspects of CTS. NCS exclusively evaluate nerve function, whereas the patient-orientated questionnaires take into account not only the symptoms of CTS but accompanying pathologies as well, such as flexor tenosynovitis. Some authors have suggested that both methods should be used together because these are complementary [16,27].

In this study, we aimed to evaluate the impact of CTR on various NCS measures performed both by conventional instrumentation and by the use of a new hand-held device designed to perform neurophysiological studies of CTS more easily. These results will be compared to a validated, self-administered questionnaire. The correlation between NCS measures and clinical scores before and after CTR was calculated. Any association between CTS, CTR and ulnar nerve NCS will also be assessed.

Patients and methods

The study was based in secondary care in a single hospital that is the normal base for a regional Carpal Tunnel Service. Approval was sought from and granted by the local Ethics Committee.

Participants exhibiting symptoms suggestive of CTS were recruited from the normal referral stream to the Carpal Tunnel Service. They were referred by their general practitioners or other specialists within secondary care.

An experienced member of the study unit clinically assessed all those referred. If the clinical findings were consistent with a diagnosis of CTS, they were formally recruited to the study. In this phase, the study group consisted of 63 patients with clinical CTS. Clinical symptoms of CTS were