Upper Arm Motor Nerve Conduction Velocity Predicts the Short-term Outcome of Patients with Cubital Tunnel Syndrome after Surgery

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INTRODUCTION: Motor nerve conduction velocity (MNCV) helps to diagnose cubital tunnel syndrome (CBTS). Despite the effectiveness of MNCV for diagnosis, the slowing of MNCV across the elbow does not accurately reflect the severity of disease and predict surgical outcomes. On the other hand, the slowing of proximal MNCV in carpal tunnel syndrome has been reported to be associated with severity, duration of nerve compression and low distal CMAP. However, little is known about the alterations of the proximal MNCV of the ulnar nerve in CBTS. Therefore, we hypothesized that the slowing of upper arm MNCV (UMNCV) in CBTS was associated with severe ulnar nerve compression at the elbow and worse postoperative outcomes. Here, the purpose of the present study was to elucidated the correlation of UMNCV with both preoperative severity and postoperative prognosis.

METHODS: Before the enrollment of patients, the study was approved by the institutional review board of our hospital. A retrospective study of CBTS patients who treated by anterior subcutaneous transposition with at least six months postoperative follow-up between April 2000 and March 2023 was conducted. Patients with CBTS were divided into two groups, the normal UMNCV group and the reduced UMNCV group, based on a cut-off value of 53 m/s. In these two groups, age, sex, BMI, disease duration, elbow and forearm MNCV, compound muscle action potential (CMAP), loss of sensory nerve action potentials (SNAPs), preoperative modified McGowan grade and postoperative outcomes at 1 and 6 months according to the Messina classification were compared.

RESULTS SECTION: Comparing between the normal and reduced UMNCV groups, the reduced UMNCV group was significantly older and had lower MNCV at the elbow and forearm, lower CMAP and more loss of SNAPs. There was no statistical difference in sex, BMI, disease duration and postoperative McGowan grade. The reduced UMNCV group had better Messina grade at 1 month ($p < 0.001$) and 6 months ($p = 0.006$) after the operation than the normal UMNCV group.

DISCUSSION: To the best of our knowledge, clinical significance of UMNCV in CBTS were unknown. The reduction in forearm MNCV in CTS is thought to be due to retrograde axonal atrophy or retrograde conduction slowing, but the relationship to severity and prognosis is still controversial. Reduced UMNCV in CBTS patients may be an indicator of prognosis due to lower CMAP and loss of SNAPs, which have been reported to correlate with prognosis in the past, and poor Messina grade in the short-term follow-up after surgery. However, age or conduction block at the elbow may have had an effect, and more detailed studies are needed in the future.

SIGNIFICANCE/CLINICAL RELEVANCE: The slowing of UMNCV might help to determine the necessity and timing of surgical procedure.