

Summary

Median Nerve Ultrasonography Examination Correlates for the Diagnosis of Moderate to Severe Carpal Tunnel Syndrome

Objective:

The aim of the study was to investigate the associations of cross-sectional area (CSA) of the median nerve measured by ultrasonography (US), the median to ulnar nerve ratio (MUR), the median to ulnar nerve difference (MUD) and the ratio of CSA of the median nerve to height squared (MHS) in relation to electrodiagnostic classification of moderate and severe carpal tunnel syndrome (CTS) and thus to identify patients suitable for surgical treatment.

Materials and Methods:

A prospective study was conducted in patients aged ≥ 18 years who underwent both median and ulnar nerve US and electrodiagnostic studies (EDS). 124 wrists of 62 patients were examined. The patients' characteristics were acquired through a questionnaire. CTS was diagnosed using EDS and classified according to the guidelines of the Czech Republic Association of Electrodiagnostic Medicine. The CSA of the median nerve and of the ulnar nerve were measured at the carpal tunnel inlet, i.e. at the level of the pisiform bone.

Results:

The median nerve swells at the wrist in CTS. Median nerve CSA at the tunnel inlet $\geq 12\text{mm}^2$ correlates with electrodiagnostic classification of moderate to severe carpal tunnel syndrome. At this cut-off value, the sensitivity of US is 82.4%, its specificity is 87.7%, the positive predictive value is 82.4% and the negative predictive value is 87.7%. MUD, MUR and MHS perform worse than the median nerve CSA, as shown by their lower area under the Receiver Operating Characteristic curve (AUC ROC).

Conclusions:

Ultrasound could help us indicate surgical treatment for CTS, especially in patients with clinical findings. Our results suggest a cut-off value of CSA at the tunnel inlet of $\geq 12\text{mm}^2$ as a good threshold for the diagnosis of moderate and severe CTS with reasonably balanced sensitivity and specificity.

Clinical consequences

Usually, a combination of clinical examination supplemented by EDS allows one to conclude that a patient's condition is due to a problem with one nerve. US can add structural information that EDS cannot determine, such as compressive cysts, tumors, and vessels in some cases of the median neuropathy. US is a reliable method for diagnosing moderate to

severe CTS. Median nerve CSA at the tunnel inlet, for instance at the suggested threshold value of 12 mm², could substantially help us indicate surgical CTS treatment.