

Riches-Cannieu Anastomosis: An Electrophysiology Study in Hong Kong Chinese and Its Implications in Carpal Tunnel Syndrome

W. Mak, R. T. F. Cheung, S. L. Ho

Neurodiagnostic Unit, Department of Medicine, Queen Mary Hospital, Hong Kong

Background

Riches-Cannieu Anastomosis (RCA), a neural communication between ulnar and median nerves in the palm, is not an uncommon anatomical variant but its importance is seldom appreciated. The validity of grading Carpal Tunnel Syndrome (CTS) by motor conduction parameters may be affected in the presence of RCA.

Methods

We studied consecutive referrals to WM's sessions over 9 months, excluding patients with ulnar or generalised neuropathies and non-Chinese. Compound muscle action potential (cMAP) was recorded from abductor pollicis brevis with median and ulnar stimulations at the wrist. The proportions of cMAP attributable to median or ulnar supply were used to calculate their respective nerve innervation ratio (NIR). Severity of CTS was graded by electrodiagnostic criteria.

Results

186 hands in 93 subjects (31 male, 62 female, mean age 52 years, range 15–82) were studied, with CTS present in 68 hands (minimal 17, mild 17, moderate/severe 34). RCA was detected in 170 hands (91.4%). Mean median NIR was 0.69 (SD 0.169, range 0.26–1.0) for all hands and 0.71 (SD 0.165, range 0.32–1.0) for hands without CTS. Predominant ulnar innervation was found in 13.4% of all hands and 10.2% of hands without CTS. Degree of asymmetry of RCA in subjects without CTS (n=52) was up to 0.48. In hands without CTS, CTS of less than moderate severity, or moderate/severe CTS, mean median cMAP amplitude were 11.5, 10.58 or 7.49 mV (ANOVA $P < 0.001$), respectively. However, ulnar cMAP was ≥ 3.5 mV in 73.5% and ≥ 5 mV in 44.1% of hands classified as moderate/severe CTS. Summated median and ulnar cMAP in this group ranged from 2.93–21.42 mV (mean 12.53, SD 3.850).

Conclusion

Dual median-ulnar innervation of thenar muscles via an RCA is extremely common. In the presence of a significant RCA, (1) CTS grading by electrodiagnostic criteria may not be accurate; (2) Diagnosis of CTS by detecting wrist to palm segmental motor conduction block will not be valid; (3) Prognosis, and hence treatment, of CTS or other median neuropathies will be different.