Carpal Tunnel Syndrome Diagnosis

Standard: perform a median sensory nerve conduction study (NCS) across the wrist with conduction distance of 13 to 14 cm. If abnormal, compare to an adjacent sensory nerve in the symptomatic limb 2. Standard: if the initial median sensory NCS across the wrist is normal then additional comparison studies are recommended 3. Guideline: motor NCS of the median nerve recording from the thenar muscle and of 1 other nerve in the symptomatic limb 4. Option: supplementary NCS 5. Option: needle electromyography (EMG) of cervical root screen muscles including a thenar muscle

Ultrasonography criteria have become increasingly useful for the diagnosis.

Ultrasonography

Ultrasonography is better tolerated, less expensive, yet just as effective as other diagnostic methods. It provides a good indication of the severity of the condition and it allows anatomical variants to be discerned. In light of this, for a number of medical professionals it is the first-line examination. In terms of therapeutic use, ultrasound can be used to guide infiltrations. In case medical treatment is unsuccessful, release by transection of the flexor retinaculum is generally done surgically as an open procedure or by endoscopy. A new minimally invasive percutaneous treatment to release the nerve based on ultrasonography guided or ultrasound surgery appears to be a promising alternative, however, to conventional open surgery or endoscopic treatments. [1)].

Ultrasonography (US) also has been shown to be a useful diagnostic tool in CTS and is based on an increase in the median nerve cross-sectional area (CSA) at the level of the pisiform bone.

It is expected that sonography may serve as an additional or complementary method which is useful and reliable in assessing the severity of CTS [2)], whether such ultrasound data can indicate the severity of carpal tunnel syndrome remains controversial.

Zhang et al. hypothesized that the ratio of the cross-sectional areas of the median nerve at the carpal tunnel inlet to outlet accurately reflects the severity of carpal tunnel syndrome. To test this, high-resolution ultrasound with a linear array transducer at 5-17 MHz was used to assess 77 patients with carpal tunnel syndrome. The results showed that the cut-off point for the inlet-to-outlet ratio was 1.14. Significant differences in the inlet-to-outlet ratio were found among patients with mild, moderate, and severe carpal tunnel syndrome. The cut-off point in the ratio of cross-sectional areas of the median nerve was 1.29 between mild and more severe (moderate and severe) carpal tunnel syndrome patients with 64.7% sensitivity and 72.7% specificity. The cut-off point in the ratio of cross-sectional areas of the median nerve was 1.52 between the moderate and severe carpal tunnel syndrome patients with 80.0% sensitivity and 64.7% specificity. These results suggest that the inlet-to-outlet ratio reflected the severity of carpal tunnel syndrome [3)].

Laboratory tests

Recommended in cases where an underlying peripheral neuropathy is suspected (e.g., a young individual with no risk factors such as repetitive hand use). This same protocol is a useful initial workup for any case of peripheral neuropathy:

1. thyroid hormone levels (T4 (total or free) & TSH): to R/O myxedema

2. CBC: anemia is common in multiple myeloma

3. electrolytes:

a) standard panel (Na, K, Cl, BUN, creatinine, glucose): to R/O chronic renal failure that could cause uremic neuropathy

b) HgA1c and blood glucose: R/O diabetes

4. vitamin B12, folate & MMA (methylmalonic acid) levels to R/O clinically significant vitamin B12 deficiency

5. in cases suspicious for multiple myeloma

a) 24 hour urine for kappa Bence-Jones protein

b) bloodwork: SPEP with reflex IFE and FLC

c) skeletal radiologic survey

6. light-chain assay: in patients with associated kidney failure to R/O light-chain deposition disease (LCDD) which differs from amyloid because light chain immunoglobulins are deposited in the absence of amyloid granules

7. hTTR: genetic testing for TTR gene mutations in suspected cases (peripheral neuropathy with cardiac and GI symptoms) to rule out hereditary TTR (hTTR) amyloidosis, an autosomal dominant hereditary form of amyloidosis where one of many possible mutations of the TTR (transthyretin) gene causes deposition of abnormal TTR (amyloid) which may produce CTS, often also associated with cardiac and GI symptoms beginning between ages 40-65 years

1)
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2)
Ghasemi M, Abrishamchi F, Basiri K, Meamar R, Rezvani M. Can we define severity of carpal tunnel syndrome by ultrasound? Adv Biomed Res. 2015 Jul 27;4:138. doi: 10.4103/2277-9175.161537. eCollection 2015. PubMed PMID: 26322286.
3)
Zhang L, Rehemutula A, Peng F, Yu C, Wang TB, Chen L. Does the ratio of the carpal tunnel inlet and outlet cross-sectional areas in the median nerve reflect carpal tunnel syndrome severity? Neural Regen Res. 2015 Jul;10(7):1172-6. doi: 10.4103/1673-5374.160117. PubMed PMID: 26330845.