

Why Aren't We Imaging the Carpel Tunnel?

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There are a lot of carpal tunnel surgeries being performed, which may not be necessary with initial appropriate treatment and management. Carpal tunnel syndrome (CTS) is already very common in the population. It can be a chronic and disabling condition. I don't think I need to review with you the symptoms and clinical findings, but I will review with you the three main theories regarding the etiology of CTS:

1. The local entrapment of the median nerve within the carpal tunnel. This condition is classified into three groups:
 1. A decrease in the size of the carpal tunnel due to bony or soft tissue changes, such as misalignment of the carpal bones, fractures, dislocation, or hypertrophic osteophytes or fibrous scarring.
 2. An increase in the volume of the normal content of the carpal tunnel. This can be due to occupational hypertrophy of the muscles and tendons in the carpal tunnel, which is not uncommon in dentists, tennis and golfers, typists, factory workers, and persons confined to wheelchairs. Synovial proliferation due to arthritis, tenosynovitis, edema due to congestive heart failure, and amyloid in patients on dialysis are other less common causes of an increase in the content of the carpal tunnel.
 3. Space-occupying lesions such as lipoma and ganglion cysts will also cause entrapment of the median nerve within the carpal tunnel.
2. Systemic diseases also will cause neuritis affecting the median nerve: most commonly diabetes, which is found in seven percent of patients with CTS.
3. The third cause of CTS has been labeled as "idiopathic." In fact, half of patients with CTS have an unknown etiology. CTS has also been associated with menopause and late-trimester pregnancy.

Carpal tunnel syndrome constitutes a major part of the occupational upper-extremity disorders and is associated with considerable health care and indemnity costs. It is described as the most common peripheral mononeuropathy, and little is known about its prevalence in the general population. A recent epidemiological study reported in *JAMA* by Atroshi, et al., found that 14.4 percent of the population had some form of pain, numbness, and/or tingling in the median nerve distribution.¹ Despite the high incidence of surgery of CTS, no standard criteria for clinical diagnosis have been established. At present, diagnostic parameters include clinical history, clinical signs and nerve conduction studies, which can be equivocal. Imaging modalities prior to MR have been in most circumstances non-contributory with the exception of osseous lesions. Likewise, the choice of conservative or surgical treatment is largely still empirical. The reason for the success or failure of conservative or surgical treatment is poorly understood, perhaps because the exact cause for the symptoms is often not clearly established. There is also no consensus on whether CTS is a clinical or electrophysiological diagnosis.

In my opinion, even if a patient has a positive electrophysiological median neuropathy, it wouldn't hurt to first allow the patient to undergo a trial period of conservative treatment, and possibly even have an MRI to determine the possible cause of the symptoms. The role of MRI in the evaluation of carpal tunnel syndrome has not been definitive because there are no parameters for conservative or surgical treatment. Often the patient undergoes surgery whenever the orthopedist feels the patient has not responded to conservative care. If there is no demonstrable cause of pressure on the median nerve, conservative management should be the preferred treatment. Reasons for the failure of surgical treatment or recurrences of symptoms could be the results of: inappropriate diagnosis; Wallerian degeneration (due to delayed treatment); inadequate incision of the flexor retinaculum; postoperative scar or neuroma; or a growing space-occupying lesion within the carpal tunnel. The diagnosis and treatment of CTS could be made substantially more objective with the use of MRI.

The location, swelling and area of constriction of the median nerve can be easily assessed with MRI, which can also display edema and fluid in tendon sheaths. Additionally, ischemic necrosis of bone, incisional neuroma, and fat within the carpal tunnel can be demonstrated.

Guidelines need to be developed for CTS and treatment options, but since there are none to date, we still can take care to at least attempt determine the cause of the patient's symptoms before treatment (especially surgery) is performed.

Reference

1. Atroshi I, Gummertson C, Johnsson R, Ornstein E, Ranstam J, Rosen I. Prevalence of carpal tunnel syndrome in a general population, JAMA, Vol. 282 No. 2, July 14, 1999.

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