

Carpal Tunnel Syndrome

Carpal tunnel syndrome is a common disorder characterized by pain, burning, and tingling of the palmar surface of the hand, resulting from compression of the median nerve between the carpal ligament and other structures within the carpal tunnel (entrapment neuropathy). The volume of the contents of the tunnel can be increased by organic lesions such as synovitis of the tendon sheaths or carpal joints, recent or malhealed fractures, tumors, and occasionally congenital anomalies. Even though no anatomic lesion is apparent, flattening or even circumferential constriction of the median nerve may be observed during operative section of the ligament. The disorder may occur in pregnancy, is seen in individuals with a history of repetitive use of the hands, and may follow injuries of the wrists. A familial type of carpal tunnel syndrome has been reported in which no etiologic factor can be identified.

Carpal tunnel syndrome can also be a feature of many systemic diseases: rheumatoid arthritis and other rheumatic disorders (inflammatory tenosynovitis); myxedema, amyloidosis, sarcoidosis, and leukemia (tissue infiltration); acromegaly; hyperparathyroidism, hypocalcemia, and diabetes mellitus.

Clinical Findings

Pain in the distribution of the median nerve, which may be burning and tingling (acroparesthesia), is the initial symptom. Aching pain may radiate proximally into the forearm and occasionally proximally to the shoulder, neck, and chest. Pain is exacerbated by manual activity, particularly by extremes of volar flexion or dorsiflexion of the wrist. It may be most bothersome at night. Impairment of sensation in the median nerve distribution may not be apparent. Subtle disparity between the affected and opposite sides can be demonstrated by testing for two-point discrimination or by requiring the patient to identify different textures of cloth by rubbing them between the tips of the thumb and the index finger. Tinel's or Phalen's sign may be positive. (Tinel's sign is tingling or shock-like pain on volar wrist percussion; Phalen's sign, pain or paresthesia in the distribution of the median nerve when the patient flexes both wrists to 90 degrees with the dorsal aspects of the hands held in apposition for 60 seconds.) The carpal compression test, performed by applying direct pressure on the carpal tunnel, may be more sensitive and specific than the Tinel and Phalen tests. Muscle weakness or atrophy, especially of the abductor pollicis brevis, appears later than sensory disturbances. Useful special examinations include electromyography and determinations of segmental sensory and motor conduction delay. Distal median sensory conduction delay may be evident before motor delay.

Differential Diagnosis

This syndrome should be differentiated from other cervicobrachial pain syndromes, from compression syndromes of the median nerve in the forearm or arm, and from mononeuritis multiplex. When left-sided, it may be confused with angina pectoris.

Treatment

Treatment is directed toward relief of pressure on the median nerve. When a primary lesion is discovered, specific treatment should be given. When soft tissue swelling is a cause, elevation of the extremity may relieve symptoms. Splinting of the hand and forearm at night may be beneficial. Injection of corticosteroid into the carpal tunnel can alleviate symptoms in some patients,

particularly those with synovitis of the wrist. To reduce the chance of nerve injury, this injection should be performed by a physician thoroughly familiar with the anatomy of the carpal tunnel. Operative division of the volar carpal ligament gives lasting relief from pain, which usually subsides within a few days. Muscle strength returns gradually, but complete recovery cannot be expected when atrophy is pronounced.