Ministry of Higher Education

And Scientific Research

University of Diyala

College of Medicine

Review Article

Risk factors of Carpal tunnel syndrome

Submitted to the council of college of medicine university of Diyala .

In partial fulfillment of Requirement for the Bachelor Degree in medicine

Submitted by:_

Najlia Salih Rashid

Supervised by:_

Doctor wissam Faleh Hassan

1.1 Introduction:

Carpel tunnel syndrome (CTS) is the most common peripheral neuropathy resulting from compression of the median nerve as it passes through the carpel tunnel in the wrist. This can result in various problems including pain, tingling, numbness, swelling, or weakness of the thumb, index, middle, and ring finger. CTS affects the activities of daily living such as brushing teeth, combing hair, holding things by hand, and driving. In severe cases, numbness becomes almost constant and patients begin to develop weakness of movements of the thumb. Early in the disease course, the process is reversible. The persistence of nerve compression, however, results in the wearing away of the insulation on the nerves resulting in permanent nerve damage.

According to the US Bureau of Labor Statistics, there were 16,440 cases of CTS involving lost work days in 2005. It comprised the second most common cause of absence from work Le Blanck showed that the prevalence of CTS in the general population was 2.8–5.8%. The mean annual crude incidence of CTS was found to be 329 cases per 100,000 persons per year, and the standardized incidence was 276 cases Murthy and Meena conducted a study related to the occurrence of CTS among patients with various peripheral nerve disorders in South India. They found that CTS constituted 7% of all the peripheral nerve disorders and 83% of entrapment neuropathies The exact epidemiology in the Indian population is unknown; however, data from the West suggests an incidence of 1–3.5 cases per 100,000 person years in a region-specific distribution

Geoghegan *et al*., conducted a case control study to assess the risk factors responsible for the development of CTS. The multivariate analysis showed that risk factors associated with CTS included patients with previous wrist fractures (OR: 2.29), arthritis, obesity (2.06), and diabetes mellitus (1.51).

Boyd *et al*., conducted an observational cohort study in Canada to assess the relationship between the severity of symptoms and the success of nonoperative and postoperative treatment among 30 patients who were diagnosed with CTS. The self-reported symptoms and physical impairments were assessed and documented using Levin's symptom severity scale and functional status score. Improvements in the symptom severity score ($P < 0.0001$) and the functional status score ($P = 0.001$) were noted following surgery in patients resistant to conservative management.

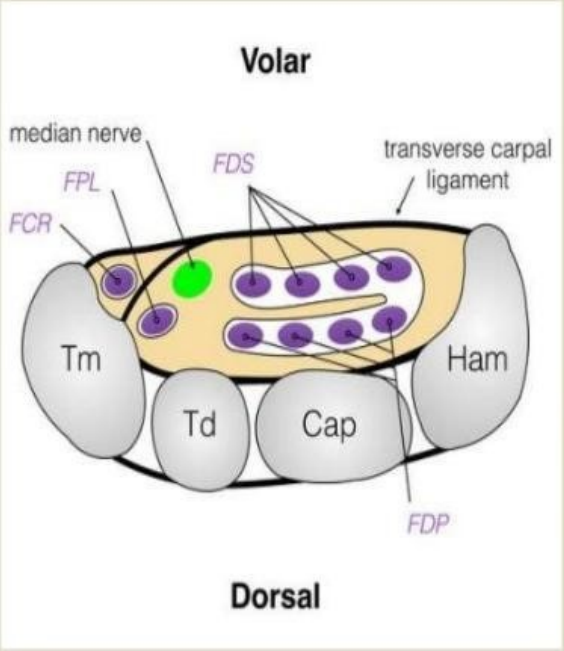
Anatomy

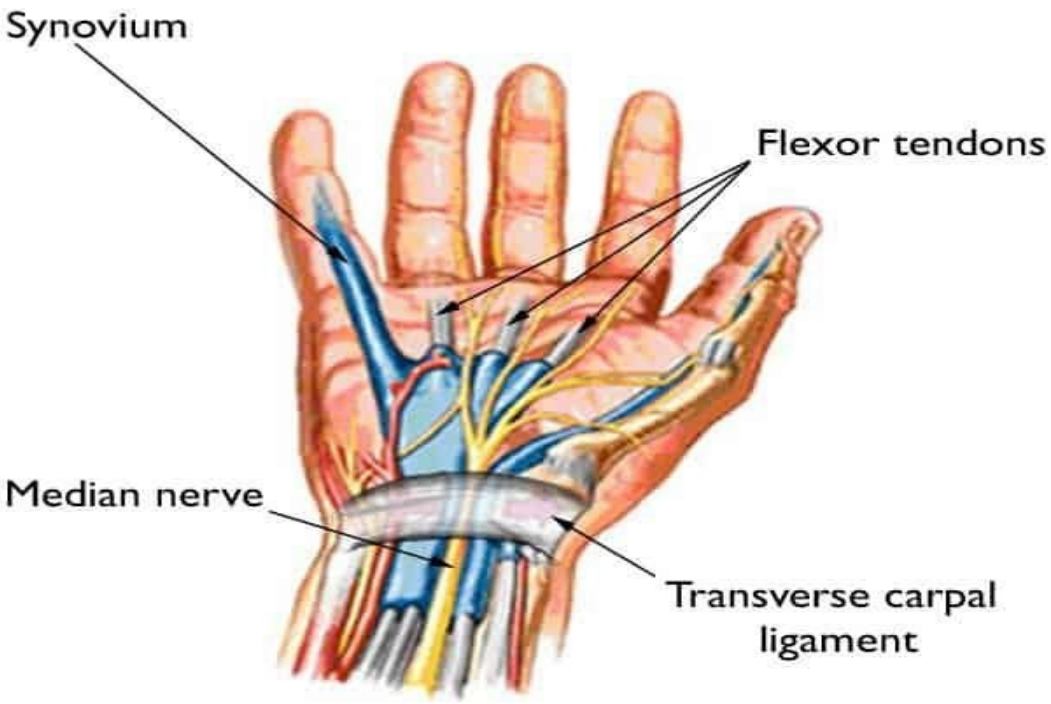
Carpus is a word derived from the Greek word "karpos"

Which means "wrist."The wrist is surrounded by a band of fibrous tissue that normally functions as a support for the joint. The tight space between this fibrous band and the wrist bone is called the carpal tunnel.

The median nerve passes through the carpal tunnel to receive sensations from the thumb, index, middle fingers of the hand.

Radiological Imaging of Carpal Tunnel Syndrome.





Pathophysiology of CTS.

The entrapment neuropathy combines phenomena of compression and traction. Nerve compression and traction may cause disorders of the intraneural microcirculation, lesions in the myelin sheath and the axon, as well as alterations in the supporting connective tissue. The entrapment of a peripheral nerve occurs as a result of its passage through an anatomical compartment that has become too tight, resulting in altered function within the nerve and dysfunction/damage of the nerve from the site of compression and beyond. Median nerve entrapment in the carpal tunnel at the wrist is the most common example of this. The available literature has indicated a combination of several pathophysiologic mechanisms in CTS. These mechanisms are interacting and include the increased pressure in the tunnel, median nerve microcirculation injury, median nerve connective tissue compression, and synovial tissue hypertrophy.

In addition to these mechanisms, the results of post-operative outcome of carpal tunnel release reported by Ozkul et al," indicated that a less favorable outcome was found among diabetic when compared with non diabetic patients. These results suggested that CTS in diabetic patients may also stem from internal factors deleterious to the nerve including hyperglycemia and

Deiciency of neurotrophic factors such as nerve growth Factor

Risk factors of Carpal tunnel syndrome

There are several risk factors that may predispose to CTS such as the coexistence of comorbidities like

1) arthritis :_Can the swelling and inflammation ,pain, and redness caused by rheumatoid arthritis cause irritation of median nerve.

2) diabetes mellitus :_Comes as a result of damage to small vessels caused by extended periods of high glucose levels. Diabetes can actually cause carpal tunnel syndrome when the high levels of glucose affect the blood vessels connected to the median nerve. But it gets more complicated than that. Research is showing that individuals with carpal tunnel syndrome who do not have diabetes are more likely to develop diabetes later in life. CTS, in fact, be a predictor of diabetes.

3)Fluid retention during pregnancy can Cause swelling in the tunnel and Symptoms of carpal tunnel syndrome. Which often go away after delivery.

4) Hemodialysis :_Amyloid deposits are considered as the main reason for median nerve compression [4,5,6], and long-term HD therapy was found to cause higher occurrence of CTS

5)other like autoimmune disorders, tumors of the wrist, and the working condition of the individuals. Industry workers such as assembly workers, food industry workers, garment industry workers, and boot and shoe manufacturers are at risk of development of CTS. Extensive physical workload has been widely recognized as a risk factor among such workers. Use of vibratory tools, repetitive hand washing, and use of a heavy grip force also predisposes to CTS.

1.2: Goals of the study:

The present study aims to determine the risk factors responsible for the development of CTS to gain a better understanding of the preventive strategies for CTS.

References:

1. Robert HW, Setty R. Neuro surgery update. 1st ed. Australia: William and Wilkins; 1991. pp. 1771-887. Back to cited text no. 1
2. Thomas D, Lambert B. Peripheral neuropathy. 4th ed. USA: W.B Saunders Publication; 2005. pp. 1841-973. Back to cited text no. 2
3. Clinical Practice Guideline on the Diagnosis of Carpel Tunnel Syndrome adopted by The American Academy of Orthopaedic Surgeons Board of Directors, 2007. Back to cited text no. 3
4. LeBlanck KE. Carpal tunnel syndrome. Am Fam Physician 2011;83:952-8. Back to cited text no. 4
5. Murthy JMK, Meena AK. Carpal tunnel syndrome: How common is the problem in South India. Neurol India 1995;43:26-8. Back to cited text no. 5
6. Cranford CS, Jason Y Ho, David MK, Brian JH. Carpal tunnel syndrome. J Am Acad Orthop Surg 2007;15:537-48. Back to cited text no. 6
7. Geoghegan JM, Clark DI, Bainbridge LC, Smith C, Hubbard R. Risk factors in carpal tunnel syndrome. J Hand Surg Br 2004;29:315-20. Back to cited text no. 7
8. Boyd KU, Gan BS, Ross DC, Richards RS, Roth JH, Mac Dermid JC. Outcomes in carpal tunnel syndrome: Symptom severity, conservative

management and progression to surgery. Clin Invest Med 2005;28:254-60. Back to cited text no. 8