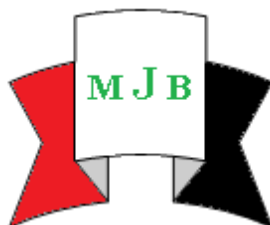


Carpal Tunnel Syndrome A Follow up Study of Sixty Cases

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Abstract

The carpal tunnel syndrome is the compression irritation syndrome of the median nerve as it cross the carpal cannal this study is designed to follow up a sixty cases of carpal tunnel syndrome, for three years after starting the treatment. Patients categorized into = mild, moderate, severe compression of the median nerve, according to Emg and Ncv results.

The study shows which patient need surgery, and which patient need conservative treatment, and the relation of the E.M.G study to the clinical presentations .

The study concentrate on the correct technique of the surgery, and when failure occur.

It is better not to rush to surgery directly and time should be given for conservative treatment.

There is some results in the study have no explanation and remain idiopathic.

Aim of the study

1-To prove that there is a place for the conservative treatment in the management of carpal tunnel syndrome.

2-To know when and why failure of surgery occur.

3-To see is the EMG findings go always with clinical presentations.

الخلاصة

متلازمة النفق الرسغي هي ضغط وتخريش العصب الوسطي عند عبوره القناة الرسغية.

هذه الدراسة صممت لدراسة و متابعة ستون حالة متلازمة النفق الرسغي لمدة تراوحت بين سنة الى ثلاث سنوات وتم تصنيف المرض الى حالة خفيفة متوسطة وشديدة بالنسبة للضغط على العصب الوسطي.

الدراسة تبين :

(١) أي من المرضى يحتاج تدخال جراحي او علاج تحفظي .

(٢) العلاقة بين نتيجة فحص تخطيط العضلات الكهربائي والاعراض السريرية للمريض.

ركزت الدراسة على الطريقة الصحيحة والامثل للتدخل الجراحي واين يحدث الفشل.

أكدت الدراسة ضرورة عدم الاستعجال لاجراء الجراحة ويجب اعطاء وقت كافي للعلاج التحفظي.

هناك بعض النتائج في الدراسة لا يوجد توضيح لها ولا تزال مبهمة.

Introduction

Carpal tunnel syndrome (CTS) is a median entrapment neuropathy, that causes paresthesia, pain, numbness, and other symptoms in the distribution of the median nerve due to its compression at the wrist in the carpal tunnel. The pathophysiology is not completely understood but can be considered

compression of the median nerve traveling through the carpal tunnel[1]. It appears to be caused by a combination of genetic and environmental factors[2]. Some of the predisposing factors include: diabetes, obesity, pregnancy, hypothyroidism, and heavy manual work or work with vibrating tools but not lighter work even if repetitive[2].

The main symptom of CTS is intermittent numbness of the thumb, index, long and radial half of the ring finger.[3] The numbness often occurs at night, with the hypothesis that the wrists are held flexed during sleep. Recent literature suggests that sleep positioning, such as sleeping on one's side, might be an associated factor.[4] It can be relieved by wearing a wrist splint that prevents flexion.[5] Long-standing CTS leads to permanent nerve damage with constant numbness, atrophy of some of the muscles of the thenar eminence, and weakness of palmar abduction.[6]

Pain in carpal tunnel syndrome is primarily numbness that is so intense that it wakes one from sleep. Pain in electrophysiologically verified CTS is associated with misinterpretation of nociception and depression.[7]

Conservative treatments include use of night splints and corticosteroid injection. The only scientifically established disease modifying treatment is surgery to cut the transverse carpal ligament.[8]

Signs and symptoms

People with CTS experience numbness, tingling, or burning sensations in the thumb and fingers, in particular the index, middle fingers, and radial half of the ring fingers, which are innervated by the median nerve. Less-specific symptoms may include pain in the wrists or hands and loss of grip strength[9] (both of which are more characteristic of painful conditions such as arthritis).

Numbness and paresthesias in the median nerve distribution are the hallmark neuropathic symptoms (NS) of carpal tunnel entrapment syndrome. Weakness and atrophy of the thenar muscles may occur if the condition remains untreated.[10]

Causes

Most cases of CTS are of unknown causes, or idiopathic.[11] Carpal

Tunnel Syndrome can be associated with any condition that causes pressure on the median nerve at the wrist. Some common conditions that can lead to CTS include obesity, oral contraceptives, hypothyroidism, arthritis, diabetes, prediabetes (impaired glucose tolerance), and trauma.[12] Carpal tunnel is also a feature of a form of Charcot-Marie-Tooth syndrome type 1 called hereditary neuropathy with liability to pressure palsies.

Other causes of this condition include intrinsic factors that exert pressure within the tunnel, and extrinsic factors (pressure exerted from outside the tunnel), which include benign tumors such as lipomas, ganglion, and vascular malformation.[13]

Carpal tunnel syndrome is provoked by repetitive movement and manipulating activities and that the exposure can be cumulative. It has also been stated that symptoms are commonly exacerbated by forceful and repetitive use of the hand and wrists in industrial occupations,[14] but it is unclear as to whether this refers to pain (which may not be due to carpal tunnel syndrome) or the more typical numbness symptoms.[15]

Associated conditions

- Rheumatoid arthritis and other diseases that cause inflammation of the flexor tendons.
- With hypothyroidism, generalized myxedema causes deposition of mucopolysaccharides within both the perineurium of the median nerve, as well as the tendons passing through the carpal tunnel.
- During pregnancy women experience CTS due to hormonal changes (high progesterone levels) and water retention (which swells the synovium), which are common during pregnancy.
- Previous injuries including fractures of the wrist.

- Medical disorders that lead to fluid retention or are associated with inflammation such as: inflammatory arthritis, Colles' fracture, amyloidosis, hypothyroidism, diabetes mellitus, acromegaly, and use of corticosteroids and estrogens.
- Carpal tunnel syndrome is also associated with repetitive activities of the hand and wrist, in particular with a combination of forceful and repetitive activities[14]
- Acromegaly causes excessive growth hormones. This causes the soft tissues and bones around the carpal tunnel to grow and compress the median nerve.[16]
- Tumors (usually benign), such as a ganglion or a lipoma, can protrude into the carpal tunnel, reducing the amount of space. This is exceedingly rare (less than 1%).
- Obesity also increases the risk of CTS: individuals classified as obese (BMI > 29) are 2.5 times more likely than slender individuals (BMI < 20) to be diagnosed with CTS.[17]
- Double-crush syndrome is a debated hypothesis that compression or irritation of nerve branches contributing to the median nerve in the neck, or anywhere above the wrist, increases sensitivity of the nerve to compression in the wrist. There is little evidence, however, that this syndrome really exists.[18]
- Heterozygous mutations in the gene SH3TC2, associated with Charcot-Marie-Tooth, confer susceptibility to neuropathy, including the carpal tunnel syndrome.[19]

Diagnosis

There is no consensus reference standard for the diagnosis of carpal tunnel syndrome. A combination of described symptoms, clinical findings, and electrophysiological testing is used by a majority of hand surgeons. Numbness in the distribution of the median nerve, nocturnal symptoms,

thenar muscle weakness/atrophy, positive Tinel's sign at the carpal tunnel, and abnormal sensory testing such as two-point discrimination have been standardized as clinical diagnostic criteria by consensus panels of experts.[20] A predominance of pain rather than numbness is unlikely to be caused by carpal tunnel syndrome no matter what the result of electrophysiological testing.

Electrodiagnostic testing (electromyography and nerve conduction velocity) can objectively verify the median nerve dysfunction. If these tests are normal, carpal tunnel syndrome is either absent or very, very mild.

Clinical assessment by history taking and physical examination can support a diagnosis of CTS.

- Phalen's maneuver is performed by flexing the wrist gently as far as possible, then holding this position and awaiting symptoms.[21] A positive test is one that results in numbness in the median nerve distribution when holding the wrist in acute flexion position within 60 seconds. The quicker the numbness starts, the more advanced the condition. Phalen's sign is defined as pain and/or paresthesias in the median-innervated fingers with one minute of wrist flexion. Only this test has been shown to correlate with CTS severity when studied prospectively.[1]

- Tinel's sign, a classic — though less sensitive - test is a way to detect irritated nerves. Tinel's is performed by lightly tapping the skin over the flexor retinaculum to elicit a sensation of tingling or "pins and needles" in the nerve distribution. Tinel's sign (pain and/or paresthesias of the median-innervated fingers with percussion over the median nerve) is less sensitive, but slightly more specific than Phalen's sign.[1]

- Durkan test, carpal compression test, or applying firm pressure to the palm over the nerve for up to 30 seconds to elicit symptoms has also been proposed.[22]

The role of MRI or ultrasound imaging in the diagnosis of carpal tunnel syndrome is unclear.[23]

Biological factors such as genetic predisposition and anthropometrics had significantly stronger causal association with carpal tunnel syndrome than occupational/environmental factors such as repetitive hand use and stressful manual work.[24] This suggests that carpal tunnel syndrome might not be preventable simply by avoiding certain activities or types of work/activities.

Treatment

Generally accepted treatments include: steroids either orally or injected locally, splinting, and surgical release of the transverse carpal ligament.[25] There is no or insufficient evidence for ultrasound, yoga, lasers, B6, and exercise therapy.[25]

Early surgery with carpal tunnel release is indicated where there is

clinical evidence of median nerve denervation or a person elects to proceed directly to surgical treatment.[26] The treatment should be switched when the current treatment fails to resolve the symptoms within 2 to 7 weeks. However, these recommendations have sufficient evidence for carpal tunnel syndrome when found in association with the following conditions: diabetes mellitus, coexistent cervical radiculopathy, hypothyroidism, polyneuropathy, pregnancy, rheumatoid arthritis, and carpal tunnel syndrome in the workplace.[26]

Surgery

Release of the transverse carpal ligament is known as "carpal tunnel release" surgery. It is recommended when there is static (constant, not just intermittent) numbness, muscle weakness, or atrophy, and when night-splinting no longer controls intermittent symptoms.[27] In general, milder cases can be controlled for months to years, but severe cases are unrelenting symptomatically and are likely to result in surgical treatment.[28]



Prognosis

Most people relieved of their carpal tunnel symptoms with conservative or surgical management find minimal residual or "nerve damage".[29] Long-term chronic carpal tunnel syndrome (typically seen in the elderly) can result in permanent "nerve damage", i.e. irreversible numbness, muscle wasting, and weakness. Those that

undergo a carpal tunnel release are nearly twice as likely as those not having surgery to develop trigger thumb in the months following the procedure.[30]

Materials and Study

Sixty cases of C.T.S are collected from the period between 2003 – 2010

patients are from Karbala, Babylon, Baghdad, Najaf, Smawa.

- Cases are distributed between mild, moderate, severe.
- Average age was 36 years, between 28 – 45 years.
- Fifty eight out of the sixty cases were female, two male cases.
- Two out of the Fifty eight female cases were recurrent after surgery.
- All female cases were house wives six of them pregnant.

Clinical examination

- The most presenting symptoms was the numbness, then pain and heaviness especially at night.
- Numbness = (12) cases
- Pain = (10) cases
- Numbness and Pain = (38) cases
- One case presented after history of cut wound at the wrist, and Neuroma of the median nerve.
- One case presented with myxodema.

EMG and N.C.S

All the cases sent for EMG and N.C.S :

- sixteen cases = severe
- Twenty four cases = moderate
- Twenty cases = mild.

Eight cases with severe clinical presentations had mild EMG and N.C.S result. And six cases with mild clinical presentations had severe EMG and N.C.S results.

One case presented with a trophy of the thinear muscle.

Side

(Forty cases) occurred in right hand and (twenty cases) occurred in the left hand.

Management

- Thirty two cases (all the mild cases and half of the moderate given the chance of conservative treatment) . which include :-

- 1- Treating the cause .
- 2- Changing the work habit .
- 3- Splint .
- 4- Anti-inflammatory and analgesics .
- 5- Local steroids .

- 50% of this number of cases had benefit :-

16 Cases :- 10 mild , (6) moderate .

- Other cases (16) managed surgically

Surgery

A thirty eight cases under go surgical intervention under G.A usual lazy S shape incision

- Peroperative findings = thickened flexor transverse ligament [which was very hard. In some cases] incision of the carpal ligament we extent it as much as possible proximally ad distally. To be sure that the median nerve completely and fully released.

- In one case we saw the median. Nerve (kinked) severely compressed just like neuroma.

- Post operatively all the cases had complete cure (except one had recurrence)

- No infection.

Table 1 distribution of cases according to sex and side.

Sex	Female	Male
	58	2
Side	Right	Left
	40	20

Table 2 distribution of cases according to severity.

No. of cases	Mild	Moderate	Severe
60	20	24	16

Table 3 presenting symptoms

No. of cases	Numbness	Pain	Heaviness
60	28	20	12

Table 4 distribution of cases according to type of management and prognosis

Type of managment	No. Of cases	Recurrence
Conservative	44	22
Surgical (22 from mild and moderate And 16 severe)	38	1

Result

CTS is a common problem affecting mostly female.

Twenty two cases from the total number of the mild and moderate cases was cured by conservative treatment, other twenty two cases sent for surgery.

Thirty eight cases managed surgically and all of them had cured, except one case had recurrence. Infection rate was zero.

Discussion

CTS is a common problem affecting mostly female, especially house wives. It affects mostly the right side.

Majority of cases were moderate presented mostly by numbness, pain, heaviness, respectively. EMG and NCS mostly show affection of both sensory and motor component of the median nerve , and there is a notable percentage of cases in which the EMG and NCS findings not reflect always the clinical presentations. A lot of mild and moderate cases can be treated conservatively by:

- 1-treating the precipitating factor that lead to the disease.
- 2-changing work habits.
- 3-wrist splintage.
- 4-anti inflammatory and analgesics with or without diuretics.
- 5-local steroids.

Surgical intervention still remain the corner stone in treating CTS,if proper technique was applied,especially in using a generous long lazy S incision and cutting the transverse ligament completely proximally and distally and not leaving any constricting points on the median nerve, and we believe that this why signs and symptoms remain postoperatively if the strict above technique not followed. We don't advice to operate on CTS under local anesthesia and with out tourniquet for the above mentioned cause.

Conclusion

C.T.S is a common orthopedic problem.

- 1- Female affected more than the male.
- 2- House wives are the usual victim.
- 3- Majority of the cases are moderate , by E.MG , NCV study
- 4- Sometimes there is no correlation between the E.M.G and N.C.V study and the clinical presentation ; mild E.M.G finding may be presented with severe clinical presentation and Vice versa.
- 5- Complete release of the flexor retinaculum proximally and distally is the key for the success of the surgery.
- 6- Right or left handed patient had no relation to the occurrence of the disease.

7- Chance should be given for the mild cases to be cured by conservative treatment and restriction of the work.

8- Diuretics may be of benefit in some cases.

9- Recurrence may occur if the surgery done under local anesthesia with small incision.

10- In long standing median nerve compression surgery may not improve the weak grip of the hand.

11- Local steroid injection has a good place in minimizing the symptoms but recurrence is usual.

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