

Open Surgery For Carpal Tunnel Syndrome Release At The University Hospital Center 'la Renaissance' in Chad

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Abstract

The carpal tunnel syndrome (CTS) is the most common compressive neuropathy of the upper limb. Management in a neurosurgical environment is infrequent. The objective of our study is to report our experience on the surgical management of this condition at the neurosurgical department at Renaissance University Hospital Center. We report 4 cases of CTS revealed by paresthesia. The patients ranged in age from 51 to 61 years, all hypertensive and including two women. The clinical presentations and the electro-neurograms had confirmed the diagnosis. Symptoms were bilateral in two cases. All patients were right handed and typists. Treatment consisted of an open release of the carpal annular ligament after unsuccessful medical treatment. The course was favorable marked by complete disappearance of clinical symptoms.

Keywords: Carpal tunnel; Median nerve; open Surgery, Electroneuromyography

Introduction

Carpal tunnel syndrome (CTS) is defined as the set of signs related to the compression of the median nerve as it passes through the carpal tunnel [1]. CTS affects 1% of the general population and 5% of the working population in the United States [2]. Its annual incidence is 300 per 100,000 inhabitants in France [3]. In Italy, CTS is the most frequent pathology affecting manual workers with a substantial growth from 2006 to 2010 of 170% [4]. In Africa, the incidence is 0.6% in Togo [5] and 0.3% in Mali [6].

Carpal tunnel surgery is the most frequent wrist and hand surgery in the USA with more than 450,000 surgical procedures per year and 140,000 surgical procedures per year in France [7,8]. The diagnosis is clinically suspected in cases of nocturnal paraesthesia in the median nerve territory and confirmed by electroneuromyography (ENMG) and/or ultrasound. Surgical treatment is undertaken by orthopaedic and neurosurgeons. It is indicated in case of failure of medical treatment or in severe forms. The objective of our study was to

evaluate the surgical management of this condition at the neurosurgery unit of teaching hospital “la Renaissance”.

Observations

Case 1

This was a 57-year-old female patient, who worked as a secretary, was right-handed, and a known hypertensive with a history of myomectomy and tonsillectomy. She was admitted for bilateral acroparesthesias with left side predominance, first nocturnal then permanent. These acrophesthesias were accompanied by electric discharge-like pain on the palmar surface of the left hand radiating to the forearm and arm. On physical examination, Tinel's and Phanel's signs were positive bilaterally. The patient also had hypoesthesia and a segmental motor deficit (power=4/5) of C8 and T1 myotomes on the left hand as well as an amyotrophic thenar muscles. Treatment with corticosteroids was carried out without complete improvement of the symptomatology.

The ENMG of the upper limbs showed a decrease in motor amplitude of the left median nerve with a lengthening of its distal motor latency and an abolition of the sensory potential of the median nerves bilaterally (Fig.1). The patient was treated with analgesics and anti-inflammatory drugs for a period of one year without improvement. A surgical procedure (release of the left median nerve) was performed (Fig.2). The postoperative course was very satisfactory. The evolution was favourable with an improvement of the motor and sensory functions and the resumption of socio-professional activities. After a post-operative follow-up period of 19 months, the evolution is favourable.

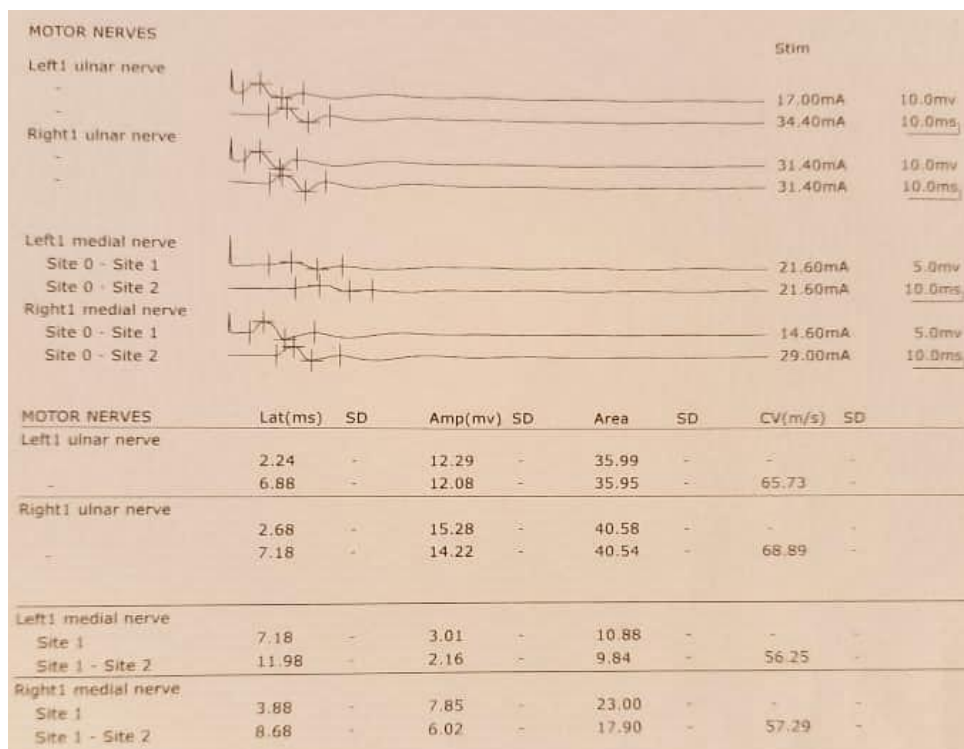


Fig.1:ENMG: Decreased motor amplitude of the left median nerve with prolongation of its distal motor latency and an abolition of sensory potential of the median nerves bilaterally

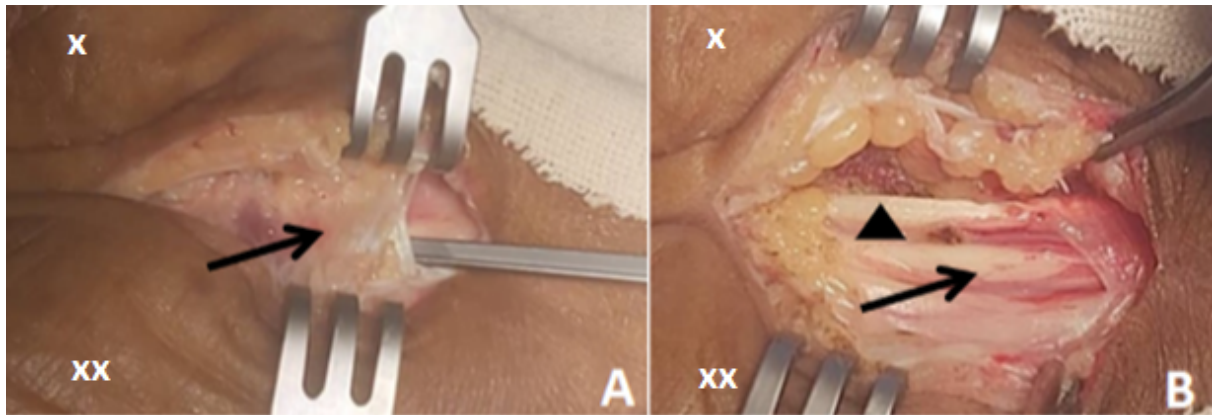


Fig.2: Intraoperative view A) anterior annular ligament of the carpus, B) median nerve (arrow), tendon of the long flexor of the thumb (head of the arrow) after section of the annular ligament. (x: thenar eminence; xx: hypothenar eminence)



Fig. 3: Post-operative scar(arrow) right hand

Case 2 and 3

This was a 61-year-old female patient, who worked as a secretary, was right-handed, diabetic and a known hypertensive. She was followed for a non-surgical cystic lesion of the pituitary gland. On admission, she presented with painful acroparesthesias of

the first 3 fingers and the radial half of the 4th finger radiating into the left forearm and shoulder, which had been evolving for 2 years, and gonalgia. This symptomatology was increased by repetitive manual activity and was worse at night.

She was subject to sleep apnea. The physical examination revealed a facial and acral dysmorphia (a ring sign; a change in shoe size: she went from 39 to 42 in 1 year), pudgy fingers. Tinel's and Phalen's signs were present bilaterally but more prominent on the left without sensory-motor deficit or amyotrophy of the thenar and hypothenar muscles.

The ENMG of the upper limbs (Tables I and II) concluded to a bilateral carpal tunnel syndrome predominantly on the left in a moderate sensorimotor form on the right and more marked on the left with the beginning of motor axonal loss (reduction of amplitude to 3.1 mV on the left).

Table I: Motor nerve conduction

Motor Nerve	Latency (ms)	Amplitude (Mv)	Conduction speed (m/s)		Amp (%)
Left Median Wrist-C.abduction Elbow-wrist	4.0 9.5	7.4 6.0	57.3	-0.3	-19
Left Cubital Wrist-C.adduction < Elbow-wrist Elbow>-<Elbow	3.2 7.0 8.1	8.3 8.2 8.3	60.5 54.5		-1 2

Table II : Sensitive nerve conduction

Sensitive Nerve	Latency (ms)	Amplitude (µV)	CV (m/s)
Right Median Thumb-wrist Major-Wrist	2.8 3.6	10 5.8	28.6 36.7
Left Median Thumb-wrist Major-Wrist	3.7 4.4	3.3 1.3	29.0 36.8
Thumb-wrist Major-Wrist Finger-Wrist	2.2	6.5	51.9

Hormonal balance (Somatotropin (hGH) was 0.6 mIU/L the normal being [0.4-29.6], somatomedin C (IGF1) was 60.4 ng/mL, 7.9 nmol/L [0.4-29.6]). Ultrasensitive corticotropin (A.C.T.H) was 117 ng/L [10.3-48.3]. Prolactinemia was estimated at 26.1 µg/L and the glycemia 6.33mmol/L. A hyperuricemia at 795mmol/L were reported.

A surgical procedure consisting of a release of the left median nerve was performed. The technique of "open surgery" was performed

under locoregional anesthesia by axillary block. The postoperative evolution was satisfactory with a disappearance of acroparesthesia. She was seen again for the same symptomatology of the right hand. The clinical examination was consistent with CTS due to the presence of Tinel's and Phalen's signs. This was confirmed by the ENMG. She was treated with analgesics (Tramadol + Paracetamol) and anti-inflammatory drugs (Ketoprofene).

A year after the first operation, a surgical release of the median nerve on the right was performed. The postoperative course was

very satisfactory with a disappearance of the symptoms. The evolution was favorable after a follow-up period of two years.

Case 4

This was a 51-year-old male patient, receptionist, who was right-handed and known to be hypertensive. He consulted for permanent tingling of the right hand evolving since 6 months and for pain of electric charge type with nocturnal predominance. He also complained of clumsiness with fine gestures and a tendency to drop objects. On physical examination, he presented an amyotrophy of the right thenar eminence (Fig. 4). The neurological examination revealed hypoesthesia of the first 3 fingers

and the radial half of the 4th finger as well as a segmental motor deficit with a muscle power of 3/5. Tinel's and Phalen's signs were present.

A surgical intervention consisting of a section of the annular ligament was performed. In the immediate aftermath of the operation, there was an improvement of the motor deficit and a disappearance of the symptomatology. At one year after surgery, the patient was asymptomatic.



Fig. 4: Amyotrophy of the thenar muscles of the right hand (arrow)

Discussion

This is a report of 4 cases followed over a 21-month period. Carpal tunnel syndrome is one of the most common upper limb ductal syndromes related in most cases to compression or irritation of the median nerve in the carpal tunnel. It represents 1% of the general population and 5% of the working population [2,9,10]. In Africa, its incidence is 0.6% in Togo [5] and 0.3% in Mali [6]. In the

African literature, few studies have been devoted to CTS. According to Binnard et al [11], the sex ratio was 3:1, in favor of women [11, 12]. CTS is more prevalent in the perimenopausal period for the age group 40 to 70 years. For most authors, the average age of discovery is around 50 years [11, 13, 14]. In our series, the sex ratio was 1/3 and

the mean age of onset was 57.5 years with extremes of 51 and 61 years.

Throughout the literature, in the vast majority of cases, CTS is idiopathic [10]. However, it can also be due to specific etiologies such as: trauma, endocrinopathies such as diabetes and acromegaly, rheumatic conditions, tumors, infectious conditions, microcrystalline deposits and others (pregnancy, obesity, dialysis, kidney failure). These conditions may expose the median nerve to compression or traction mechanisms [10-18]. For cases N°2 and 3, the patient was followed for a cystic lesion of the pituitary gland. She presented a dysmorphism affecting the extremities and the face with a normal pituitary workup. For the other two cases, we did not detect any cause. In 65 to 80 percent of cases, especially in women, the etiology remains idiopathic [12]. In our series, no etiology was detected but some risk factors were found in our patients like advanced age, manual professions (secretariat). All our patients are hypertensive. Chronic sleep loss which would be linked to an increase in blood pressure and is thought to be one of the primary underlying causes of High Blood Pressure [21, 22].

In the typical form, the clinical presentation and the ENMG alone are sufficient for the diagnosis of CTS. This is why ultrasound was not systematically used.

The involvement can be unilateral or bilateral, clinically manifested by acroparesthesias in the median nerve territory. In case of unilateral involvement, the dominant side was more affected. This could be explained by the increased use of the dominant hand in activities of daily living. Paresthesia was the main reason for consultation. All our patients were right-handed. Two patients were affected bilaterally.

Tinel's sign and Phalen's sign were found in all our patients. The sensitivity of Tinel's and Phalen's tests is 73% and 91% respectively and their specificity is 85% [23].

Amyotrophy of the thenar muscles was observed in two cases. It could be a sign of the chronicity of this condition. Hypoesthesia of the first 3 fingers and of the radial half of the 4th finger was observed in 2 cases and paresthesia of the 1st, 2nd and 3rd fingers (territory innervated by the median) was observed in 2 cases. These two signs constitute the signs of severity of this condition [12].

Atypical forms are numerous and misleading, hence the need to perform ENMG and ultrasound to support the diagnosis.

ENMG allows confirmation of the diagnosis by demonstrating a prolongation of the distal motor latency (DML) > 4 ms and a decrease in motor conduction velocity (MCV) and sensory conduction velocity (SCV) < 50 m/s [20]. In addition, ENMG is used to rule out differential diagnoses and to look for signs of severity [23]. Three cases had performed ENMG having shown median nerve involvement.

Although ultrasound is an alternative examination to ENMG, it has a triple interest, both for positive and etiological diagnosis as well as for therapeutic management. It has the advantage of being an examination that allows the analysis of anatomical structures [12]. Nevertheless, it does not allow the evaluation of the type of functional damage (sensitive or motor) of the nerve. We were satisfied with the clinical examination and the ENMG.

Conservative treatment is indicated in forms without signs of severity. The signs of severity are permanent paresthesia, loss of subjective digital sensitivity, palpal hypoesthesia, thenar amyotrophy, partial or complete paralysis of the opposing thumb, denervation sign, and median nerve cross-sectional area > 15mm² [12,9]. Medical treatment consists of corticosteroid infiltrations and immobilization with orthoses [10]. The injection of corticosteroids is performed 1 cm above the distal wrist flexion fold, between the tendons.

Immobilization of the wrist in a splint is used alone or in combination with the infiltration [10].

Surgical treatment is indicated in case of failure of medical treatment or in severe forms [7]. Decompression of the contents of the carpal tunnel by opening the flexor retinaculum is the basic procedure of surgical treatment. It is performed "open" or endoscopically. The procedure is usually performed as an outpatient surgery, under

local or locoregional anesthesia and pneumatic tourniquet [12].

After a failure of this conservative therapeutic attitude, we indicated surgery. All our patients had an open surgical intervention which consisted in a section of the anterior annular ligament of the carpus. The immediate postoperative course of all our patients was simple with improvement of the symptoms. The evolution beyond 15 months after surgery is satisfactory.

Conclusion

Carpal tunnel syndrome is a common condition in women. Clinical signs and ENMG findings are essential to make the diagnosis. Given the unavailability of endoscopic

practice, open surgery remains the reference therapeutic attitude for decompression of carpal tunnel contents in our practice.

Conflict of interest: none

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