

# Carpal tunnel syndrome: therapeutic management and outcome for 20 cases

**Abdelmoughit Echchaoui<sup>1</sup>, Omar Mourafiq<sup>2</sup>, Ahmad Al Ahmad<sup>3</sup>, Jawad Hafidi<sup>1</sup>, Samir El Mazouz<sup>1</sup>, Nour-Eddine Gharib<sup>1</sup>, Abdellah Abbassi<sup>1</sup>**

<sup>1</sup>Department of Plastic and Reconstructive Surgery, Ibn Sina University Hospital, Rabat, Morocco.

<sup>2</sup>Department of Orthopaedic Surgery & Traumatology II, Mohamed V Military Hospital, Rabat, Morocco.

<sup>3</sup>Department of Orthopaedic Surgery & Traumatology, Ibn Sina University Hospital, Rabat, Morocco.

## Abstract

**Background:** Carpal tunnel syndrome (CTS) is a constellation of symptoms associated with the compression and/or traction of the median nerve at wrist level. It is a multifactorial syndrome with high incidence rates making its prevention and management an occupational health and safety priority.

**Methods:** In this paper, we report on our experience with a retrospective study of 20 cases of CTS managed in our institution over a period of four years from January 2012 to December 2015. Pre-operative clinical features were noted in all patients. Relevant investigations were performed. Conservative treatment and surgical release through a mini incision were done and patients were followed for up to one year.

**Results:** The study included 6 men and 14 women with a mean age of  $47.1 \pm 11.6$  years. All patients complained of burning or shooting pain in the territory of the median nerve. Sensory deficits were noted in 19 (95%) of patients and motor deficit in 13 (65%) of patients. Electromyography confirmed the diagnosis in all patients. Therapeutic management incorporated a variety of techniques, of which mini open release surgery was the most used in our series. Aside from two recurrences of symptoms, the results were satisfactory for the majority of our patients at one-year of follow-up.

**Conclusion:** Pain and paresthesia were the most common presenting complaint of carpal tunnel syndrome. Mini open surgical release of carpal tunnel yielded excellent results without any complications.

**Keywords:** Carpal tunnel syndrome; Management; Outcome

## Introduction

Carpal tunnel syndrome (CTS) represents symptoms and signs associated with irritation of the median nerve in the carpal tunnel at the wrist; it accounts for approximately 90% of all entrapment neuropathies<sup>1,2</sup>.

The high incidence rates makes its prevention and management an occupational health and safety priority<sup>3</sup>.

Therapeutic management in recent years has undergone major changes with goal to be less aggressive and more effective.

In this paper, we describe the clinical presentation of carpal tunnel syndrome and outcome of different treatment modalities used in our institution.

## Methodology

This retrospective study, conducted in collaboration with three departments (plastic surgery and orthopedic surgery) in Avicenna University Hospital of Rabat and the department of orthopaedic surgery and Traumatology II in Mohamed V Military Hospital of Rabat, Morocco, included 20 patients seen over 4 years (January 2012 to December 2015).

Age, gender, medical history, clinical signs (side, time of pain), specific tests (Phalen and Tinel sign), electromyography test were performed (Table 1).

Outcome analysis criteria (self-reported symptom resolution, wrist movement and grip strength) have been used to assess response following surgery in all patients up to a period of one year.

## Address for Correspondence

**Dr. Abdelmoughit Echchaoui**

Department of Plastic and Reconstructive Surgery, IbnSina University Hospital, Rabat, Morocco.

Email: e.moughit@hotmail.fr

## Results

The average age of the patients was 47.1±11.6 years (age ranged from 29 to 68 years); with a female prevalence (sex ratio of 0.42), the right hand was the most affected (75%).

All patients noticed burning or shooting pain in the territory of the median nerve, acroparesthesias was noted in 18 cases (90%). Sensory deficit was noted in 95% of patients and motor deficit in 65% of patients. Among these patients, 35% of cases had trophic disorders.

Physical examination noted Phalen sign in 14 cases (70%) and Tinel sign in 15 cases (75%). Electromyography confirmed the diagnosis in all patients.

Medical treatment was performed in 7 patients that show mild to moderate symptoms and based on corticosteroid injection combined to the immobilization of the wrist for a period of 6 weeks during nighttime in a neutral position by a splint; the result was satisfactory within 4 months of treatment in only one patient (case n° VIII).

Mini open carpal tunnel release was performed under local anesthesia in 19 patients (including those with medical treatment failure). Post-operative courses were uneventful. Physiotherapy was carried out three months following surgical treatment in one patient (case XII) without significant improvement.

At one-year follow-up, all patients recovered normal sensitivity and mobility of their hands; however, we noted the persistence of symptoms in two cases (XII and XV) who had been scheduled again for another intervention by the same technique.

## Discussion

First described by Paget in 1854<sup>4</sup>, CTS is a compression neuropathy of the median nerve at the wrist. It affects mainly middle-aged women. In the majority of patients, the exact cause and pathogenesis of CTS remains largely unclear<sup>5</sup>.

The classic symptoms of CTS include burning pain, numbness and tingling sensation on the palmar surface of the first three fingers and the lateral side of the annular finger<sup>6</sup>.

90% of our patients reported acro-paresthesia, while in Kendall's series of 327 patients, 313 (95.7%) reported paresthesia<sup>7</sup>.

The diagnosis of CTS should be based on history, physical examination and results of nerve conduction studies<sup>3</sup>.

CTS can be treated with surgery or conservative treatment. The American Academy of Neurology's official practice guidelines recommends considering surgery only if patients not responding first to conservative therapies<sup>8</sup>. Conservative or non-invasive options are recommended for patients that show moderate symptoms, and they include: wrist splinting, injection of corticosteroids into the carpal tunnel, non-steroidal anti-inflammatory drugs, systemic steroids, pyridoxine (vitamin B6) and diuretics<sup>9,10</sup>; this kind of treatment was effective in just 5% of our patients.

Acupuncture and Ultrasound therapy are an alternative conservative treatment and have positive effects in patients showing mild to moderate symptoms<sup>11,12</sup>.

Carpal tunnel release surgery consists of the division of the transverse carpal ligament to reduce pressure to the median nerve. It is recommended in almost all patients with moderate to severe CTS<sup>13</sup>.

They are two different types of invasive treatment: release and endoscopic release. Open release of the transverse ligament provides high initial success rates, with low rates of complication, but it uses a longitudinal inter-thenar incision, approximately 4 to 5 cm in length<sup>14</sup>. Mini open release has been adopted recently and is a relatively simple and effective procedure that uses a mini-incision (less than 2 cm); and may allow for significant symptom relief, minimal scar tenderness and quicker recovery<sup>15</sup>; this technique was performed in 19 of our patients with good results.

Developed by Okutsu et al. since 1986<sup>16</sup>, endoscopic release is another new technique of performing carpal tunnel release using an endoscope, it allows more rapid recovery with reduction of scar tenderness and an earlier return to the activities of daily living<sup>17</sup>; this technique has been shown to have better outcomes than both standard open and mini-open release<sup>18</sup>. Despite its effectiveness, this technique was not performed in our context, because of non-availability of material.

Prevention tips may help to decrease risk of symptoms of CTS by treating any underlying medical condition and through proper posture and exercise programs to strengthen the fingers, hands, wrists, forearms, shoulders, and neck<sup>19</sup>.

**Conclusion:** Pain and paresthesia were the common presenting complaints of CTS. Mini open surgical release of carpal tunnel is recommended as a treatment of choice as it yielded excellent results in patients showing moderate to severe symptoms.

**Table 1. Clinical and paraclinical features of CTS**

Case	sex	Age	History	Manual activity	Topography (hand)			Functional signs		Associated signs			Physical examination		Electromyogram	
					R	L	B	Pain	Acroparaesthesia	Motor deficit	Sensory deficit	Trophic disorders	Tinel test	Phalen test	Sign of muscle denervation	Motor and sensory conduction
I	M	36	without	+	+			+	+	-	+	-	+ / -	+	partial	abnormal
II	M	30	Trauma of the right hand	+	+			+	-	+	+	+	+	+	total	abnormal
III	M	40	Hypertensive	+	+			+	+	+	+	-	-	-	partial	abnormal
IV	M	66	without	-	+			+	+	+	+	+	+	+	partial	abnormal
V	M	35	Diabetic	+			+	+	+	+	+	+	+ / -	+ / -	partial	abnormal
VI	M	38	without	+	+			+	+	-	+	-	+	-	partial	abnormal
VII	F	29	without	+	+			+	+	-	-	-	+ / -	+ / -	partial	abnormal
VIII	F	44	Chronic hemodialysis	+	+			+	+	-	+	+	+	+ / -	partial	abnormal
IX	F	57	without	+			+	+	+	+	+	-	+	+	-	abnormal
X	F	52	Chronic hemodialysis	+	+			+	+	+	+	-	+	+	partial	abnormal
XI	F	45	Hypertensive	+	+			+	+	+	+	-	+	+	partial	Abnormal
XII	F	63	without	+			+	+	+	+	+	+	+	+	partial	abnormal
XIII	F	37	without	+	+			+	-	-	+	-	-	+ / -	-	abnormal
XIV	F	68	without	-	+			+	+	+	+	+	+	+	partial	abnormal
XV	F	52	Chronic hemodialysis	+	+			+	+	+	+	+	+	+	partial	abnormal
XVI	F	49	asthmatic	+			+	+	+	-	+	-	+	+	partial	abnormal
XVII	F	61	without	+	+			+	+	+	+	-	+	+	partial	abnormal
XVIII	F	43	Chronic hemodialysis	+	+			+	+	+	+	-	+	+	partial	abnormal
XIX	F	46	without	+			+	+	+	-	+	-	+	+	partial	abnormal
XX	F	51	without	+	+			+	+	+	+	-	+	+	partial	abnormal

M: Male; F: Female; R: Right; L: Left; B: Bilateral; (+) present; (-) absent.

## References

- Pfeffer GB, Gelberman RH, Boyes JH, Rydevik B. The history of carpal tunnel syndrome. *J Hand Surg Br.* 1988; 13(1):28-34.
- Tanaka S, Wild DK, Seligman PJ, Behrens V, Cameron L, Putz-Anderson V. The US prevalence of self-reported carpal tunnel syndrome: 1988 National Health Interview Survey data. *Am J Public Health.* 1994;84(11):1846-8.
- Aroori S, Spence RA. Carpal tunnel syndro. *Ulster Medical J.* 2008; 77(1):6-17.
- Melhorn JM. CTD: carpal tunnel syndrome, the facts and myths. *Kans Med.* 1994; 95(9):189-92.
- Mohammad G, Emad N, Andrea V, Afshin M, Adam A, Emal L et al. A handy review of carpal tunnel syndrome: From anatomy to diagnosis and treatment. *World J Radiol.* 2014 Jun 28; 6(6): 284-300.
- Alfonso C, Jann S, Massa R, Torreggiani A. Diagnosis, treatment and follow-up of the carpal tunnel syndrome: a review. *Neurol Sci.* 2010; 31:243-252.
- Kendall WW. Results of treatment of severe carpal tunnel syndrome without internal neurolysis of the median nerve. *J Bone Joint Surg Am.* 1988; 70(1):151.
- Practice parameter for carpal tunnel syndrome (summary statement). Report of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology* 1993;43(11): 2406-2409.
- Pal B, Morris J, Keenan J, Mangion P. Management of idiopathic carpal tunnel syndrome (ICTS): a survey of rheumatologists' practice and proposed guidelines. *Br J Rheumatol.* 1997; 36:1328-1330.
- Scholten RJPM, de Krom MCTFM, Bertelsmann FW, Bouter LM. Variation in the treatment of carpal tunnel syndrome. *Muscle Nerve.* 1997; 20:1334-1335.
- Khosrawi S, Moghtaderi A, Haghghat S. Acupuncture in treatment of carpal tunnel syndrome: A randomized controlled trial study. *J Res Med Sci.* 2012; 17:1-7.
- Piravej K, Boonhong J. Effect of ultrasound thermotherapy in mild to moderate carpal tunnel syndrome. *J Med Assoc Thai.* 2004; 87 Suppl 2:S100-S106.
- Boya H, Ozcan O, Oztekin HH. Long-term complications of open carpal tunnel release. *Muscle Nerve.* 2008 Nov. 38(5):1443-6.
- Taleisnik J. The palmar cutaneous branch of the median nerve and the approach to the carpal tunnel. An anatomical study. *J Bone Joint Surg Am.* 1973; 55(6):1212-7.

15. *Abdus Saboor A, Alamzeb K, Sikandar AA, Inam UK, Sajid NB, Ehtisham A et al. J Ayub Med Coll Abbottabad 2015;27(1):192-6*
16. *Okutsu I, Ninomiya S, Takatori Y, Ugawa Y. Endoscopic management of carpal tunnel syndrome. Arthroscopy 1989; 5:11-18.*
17. *Young JK. Limited mini open carpal release. Kor J Spine 2008; 5(1):18-23.*
18. *Aslani HR, Alizadeh K, Eajazi A, Karimi A, Karimi MH, Zaferani Z et al. Comparison of carpal tunnel release with three different techniques. Clin Neurol Neurosurg 2012; 114:965-968.*
19. *Seradge H, Bear C, Bithell D. Preventing carpal tunnel syndrome and cumulative trauma disorder: effect of carpal tunnel decompression exercises: an Oklahoma experience. J Okla State Med Assoc 2000 Apr; 93(4):150-3.*

Conflict of interest: **Nil**

Source of funding: **Nil**

Date received: November 27th 2016

Date accepted: December 19<sup>th</sup> 2016