

# A clinical profile and factors associated with carpal tunnel syndrome: Experience from tertiary centre

Kamlesh A Jagiasi<sup>1</sup>, Girish S Soni<sup>2\*</sup>, Pawan Ojha<sup>3</sup>, Nikhil Kadam<sup>4</sup>, Akash Cheda<sup>5</sup>,  
Shashank Nagendra<sup>6</sup>

<sup>1,2,3</sup>Associate Professor, <sup>4,5,6</sup>Resident, Department of Neurology, Grant Government Medical college and sir JJ Hospital, Mumbai, Maharashtra, INDIA.

Email: [sonigirish@gmail.com](mailto:sonigirish@gmail.com)

## Abstract

**Background:** Carpal tunnel syndrome (CTS) is the most commonly-encountered entrapment neuropathy and routinely seen mononeuropathy in busy neurology out patients departments. There is a need to study the clinical features and associated factors in greater precision as it is a readily treatable disorder with excellent treatment outcomes. **Aims and Objectives:** To study clinical profile and factors associated with Carpel tunnel syndrome. **Methodology:** This is a cross-sectional study done in patients presenting with clinical features of CTS at tertiary health care center during the year January 2015 to January 2016. The detailed clinical and electrophysiological examination was done. Stevens's severity scale was used to classify as per the severity. The patients cohort were later divided in two groups ;those fulfilling clinical and electrophysiology criteria for CTS(Group 1) and those who are having just wrist pain due to other etiology (Group 2).The appropriate statistical tests were used to compare associated factors in both the groups. **Results:** Total of 240patients was included.128 patients were fulfilling clinical and electrophysiology criteria for CTS and 112 patients were of nonspecific wrist pain only. In this study, female preponderance was seen with majority in the age group of 30-45(40.63). The exacerbations of pain at night occurred in 95.00%. The pain and tingling in thumb, middle and index fingers occurred in 90.63% and that in entire arm was seen in 65%. The Motor weakness involves Abductor pollicis brevis in 46.88 % patient. Tinels sign (50%); Phalens test (65%) Tourniquet test was positive in 85%.The significantly associated factors were Female sex, Acute, severe flexion/extension injury of wrist, Obese (BMI> 30), Diabetes. **Conclusion:** General neurologists and physicians should keep suspicion of this common neuropathy in obese females of older age groups with associated risk factors like diabetes, hypothyroidism and arthritis. The clinical features described in this study will help in more precise diagnosis of this ubiquitous disorder.

**Key Words:** Carpel tunnel syndrome, Hypothyroidism, Diabetes, Rheumatoid arthritis.

## \*Address for Correspondence:

Dr. Girish S. Soni, Associate Professor, Department of Neurology, Fourth floor, Main building, Grant govt Medical college and Sir JJ group of hospitals, Byculla, Mumbai, Maharashtra, INDIA.

Email: [sonigirish@gmail.com](mailto:sonigirish@gmail.com)

Received Date: 14/08/2017 Revised Date: 10/09/2017 Accepted Date: 22/10/2017

DOI: <https://doi.org/10.26611/10214110>

Access this article online	
Quick Response Code:	Website: <a href="http://www.medpulse.in">www.medpulse.in</a>
	Accessed Date: 22 October 2017

## INTRODUCTION

Carpal Tunnel Syndrome (CTS) is the most common compressive peripheral neuropathy in the upper

extremity. Its prevalence is 139 per 100,000 person-years for men and 506 per 100,000 person-years for women<sup>1, 2</sup>. In India, CTS is a common problem with an estimated annual incidence rate of 0.5-5.1 per 1000.<sup>3</sup> The symptoms and signs are caused by compression of the median nerve along the carpal tunnel, which is formed on the distal, medial, and lateral sides by the carpal bones and on the volar surface by the deep transverse carpal ligaments. The classic symptoms of CTS are numbness and paraesthesia in the first three fingers of the hand, which is commonly exacerbated at night<sup>2</sup>. The diagnostic signs include sensory loss along the lateral aspect of the hand in the distribution of median nerve, motor weakness and wasting of abductor pollicis brevis (APB) muscle, and eliciting Tinel's and Phalen's sign at the wrist. The nerve

conduction study (NCS) study is a definite diagnostic test for CTS.<sup>4,5</sup> Congenital predisposition is the commonest cause of CTS in which carpal tunnel is simply narrower in some people than in others especially middle-aged people. Other factors which contribute in its causation are stressful work, injury, trauma, endocrine disorders, joint deformities, fluid retention, and the development of any space occupying lesions in the tunnel.<sup>6-8</sup> CTS is a routinely encountered disease in busy neurology OPD, hence there is a need to study clinical features and factors associated with it in greater precision. Hence the following study has been undertaken from tertiary care institute.

**MATERIAL AND METHODS**

Study design: A cross-sectional study was carried out in department of neurology of tertiary medical college and hospital from January 2015 to January 2016. The study was approved by local ethical committee. The written informed consent was taken from each patient in prescribed proformas.

**RESULT**

**Inclusion Criteria:** The patients presenting with clinical features of Carpel tunnel syndrome were included.

**Exclusion Criteria:** Those patients who did not give consent for the study were excluded.

Study method: The patients had undergone thorough clinically examination and detailed electrophysiology from our lab. Stevens’s severity scale was used to classify the severity<sup>9</sup>. Those who fulfilled clinical and electrophysiological criteria were classified as patients with carpel tunnel syndrome (Group 1) and those who fail to clinical criteria were classified as wrist pain only(Group 2). The details of the patients like age, sex, clinical features, and associated factors were recorded. The diagnosis of associated factors was done by clinical and by various laboratory investigations like RA-Factor, Thyroid test, BSL fasting and Post prandial, Localsography of the wrist.

**Statistical Tests:** The data is presented in Tabular form and expressed by percentages. The associated factors in both the groups were compared by Z-test (Standard error of Difference between two Proportions) by SPSS 19 version software.

**Table 1:** Distribution of the patients as per the Age

Age	No.	Percentage (%)
15-30	28	21.88
30-45	52	28.13
45-60	36	40.63
>60	12	9.38
<b>Total</b>	<b>128</b>	<b>100.00</b>

The majority of the patients were in the age group of 30-45 i.e. 40.63% followed by 45-60 40.63%, 45-60 were 28.13%, 15-30 were 21.88%, >60 were 9.38%.

**Table 2:** Distribution of the patients as per the sex

Sex	No.	Percentage (%)
Female	72	56.25
Male	56	43.75
<b>Total</b>	<b>128</b>	<b>100.00</b>

The majority of the patients were female i.e. 56.25 % followed by Male i.e. 43.75%

**Table 3:** Distribution of the patients with Clinical features

Symptoms	No.	Percentage (%)
Exacerbations of pain at night	122	95.00%
Pain and tingling in thumb, middle and index fingers	116	90.63
Pain in forearm, arm and shoulder	84	65.63
Motor weakness involve median innervated muscle	60	46.88
Autonomic symptoms	28	21.88

The exacerbations of pain at night occurred in 95.00%. The pain and tingling in thumb, middle and index fingers occurred in 90.63%; the pain in forearm and sometimes in arm and shoulder was in 65.63%.Themost common finger involved was middle finger followed by index finger. Also, the pain was encountered more in etiologies like diabetes and idiopathic variety. Themotor weakness involve median innervated muscle, most common being APB in 46.88 % patients. The autonomic symptoms were 21.88%.

**Table 4:** Distribution of the patients as per the Clinical method of Demonstration

Clinical method of demonstration	No.	Percentage (%)
Tinels- positive	64	50%
Phalens- positive	83	65%
Tourniquet test	109	85%

As per the Clinical method of Demonstration; Tinels test was positive in 50% cases and Phalens test was positive in 65% cases. The Tourniquet test (Arm compression test by sphygmomanometer) was positive in 85% of cases.

**Table 5:** Distribution of the patients as per the associated factors in Carpel Tunnel Syndrome And wrist pain only

Associated factors	Carpel Tunnel Syndrome (n=128)		Wrist pain only (n=112)		Z-Test (Standard error of difference between two proportions)
	No.	Percentage (%)	No.	Percentage (%)	
Female	72	56.25	32	28.27	Z-Score is 4.317. The p-value <0.05
Acute, severe flexion/extension injury of wrist	25	19.53	10	8.93	Z-Score is 2.3218. The p-value is 0.02
Obese (BMI> 30)	19	14.84	7	6.25	Z-Score is 2.137. The p-value is 0.03
Diabetes	15	11.72	5	4.46	Z-Score is 2.0286. The p-value is 0.04
Thyroid disorders	13	10.16	4	3.57	Z-Score is 1.9837. The p-value is 0.04
Old age	12	9.38	3	2.68	Z-Score is 2.1381. The p-value is 0.03
Rheumatoid arthritis	9	7.03	1	0.89	Z-Score is 2.3742. The p-value is 0.01
Wrist fracture	11	8.59	3	2.68	Z-Score is 2.3246. The p-value is 0.02
Menopause	13	10.16	3	2.68	Z-Score is 2.3169. The p-value is 0.02
Space-occupying lesions	10	7.81	2	1.79	Z-Score is 2.1372. The p-value is 0.03

The significantly associated factors were Female sex (Z=4.317. The p <0.05), Acute, severe flexion/extension injury of wrist (Z=2.3218. P< 0.02), Obese (BMI> 30) (Z= 2.137, p<0.03), Diabetes (Z=2.0286. p< 0.04).

**Table 6:** Distribution of the patients as per the Severity Grades and Nerve conduction studies (Stevens's severity grade)

Grades of Severity	No of patients	Median sensory SNAP distal latency(DL) and amplitude	Median motor CMAP distal latency and amplitude
Mild	50 (39.06)	Prolonged DL +/- reduced amplitude	Normal
Moderate	40 (31.25)	Prolonged DL +/- reduced amplitude	Prolonged DL
Severe	28 (21.88)	Absent SNAP	Lower amplitude
Very severe	10 (7.81)	Absent SNAP	Absent CMAP with preserved lumbrical response

As per the Severity mild were 39.06 %, moderate were 31.25 %, severe were 21.88 % and very severe were 7.81%.

## DISCUSSION

The CTS is considered to be the most common entrapment neuropathy.<sup>10</sup> the incidence rate of CTS ranges from 0.125-1%, and the prevalence rate approximately 5-16%, depending upon the criteria used for the diagnosis. It is a condition of middle-aged individuals, and affects females more than males. Since its first description by Phalen in 1950s<sup>11</sup> several studies have reported marked female preponderance, and a peak incidence of age of 55-60 years. In our study, there was a female preponderance. Though majority of our studied population fall in age group of 30-45 years we concluded with statistical significant tests that the older population is more likely to present with CTS semiology. This may be due to development of associated factors of CTS as well as wear and tear injury to wrist. The findings of our study are largely comparable to the study done by Hussein Mohammed Malibary *et al*<sup>12</sup> where female predominance with age group more than 50 were found. The most

common symptoms which raised the suspicion of CTS was night exacerbations of the symptoms. Majority of the patients in our study did have worsening. So we urge neurologists to ask the question specifically to their patients to improve the precision of diagnosis. Also the pain locates most likely around first to fourth finger in CTS cases which is acceptable as per the topography of the injured nerve. We observed the consistent involvement of middle finger followed by index finger in our patients. The pain was more commonly found in patients having diabetes and idiopathic variety of CTS. But these parameters needs further validation from focused study designs. The most common associated factors were Acute, severe flexion/extension injury of wrist 78.13% followed by Female 56.25%, Obesity (BMI >30) in 53.13 %, Diabetes -46.88%, Thyroid disorders -28.13%, Old age -28.13%, Rheumatoid arthritis-21.88%, Wrist fracture-18.75%, Menopause -15.63%, Space-occupying lesions -9.38%.

## CONCLUSION

The mainstay of conclusions from our study reside on improvement of clinical precision and associated factors consideration. The clinical features described in this study will help in more precise diagnosis of this ubiquitous disorder.

1. The CTS should be thought of more precisely in older age female with comorbidities like Diabetes, thyroid disorders, arthritis.
2. The most common clinical features were exacerbations of pain at night, pain and tingling, motor weakness involving median innervated muscle. The consistent involvement of middle finger followed by index finger in our patients highlights the naïve finding.
3. CTS due to Diabetes and idiopathic variety most likely present with pain as major clinical symptom
4. The significantly associated factors were Female sex, Acute, severe flexion/extension injury of wrist, Obesity, Diabetes.

The study highlights further focused research on the pattern of abnormalities in different associated factors of CTS.

## REFERENCES

1. Mondelli M, Giannini F, Giacchi M. Carpal tunnel syndrome incidence in general population. *Neurology* 2002; 58:289-94.
2. Bland JD. Do nerve conduction studies predict the outcome of carpal tunnel compression? *Muscle Nerve* 2001; 24:935-40

3. Jagga V. Occupation and its association with carpal tunnel syndrome: A review. *J Exercise Sci Physiotherapy*. 2011; 7:68-78.
4. Sternbach G. The carpal tunnel syndrome. *J Emerg Med*. 1999; 17(3):519-523.
5. Bland JD. Do nerve conduction studies predict the outcome of carpal tunnel compression? *Muscle Nerve*. 2001; 24(7):935-940.
6. Foley M, Silverstein B, Polissar N. The economic burden of carpal tunnel syndrome: long-term earnings of CTS claimants in Washington State. *Am J Ind Med*. 2007; 50(3):155-172.
7. NINDS (National Institute of Neurological Disorder and Stroke), Carpal Tunnel Syndrome Fact Sheet, 2007. [http://www.ninds.nih.gov/disorders/carpal\\_tunnel/detail\\_carpal\\_tunnel.htm#68963049](http://www.ninds.nih.gov/disorders/carpal_tunnel/detail_carpal_tunnel.htm#68963049)
8. Lam N, Thurston A. Association of obesity, gender, age and occupation with carpal tunnel syndrome. *Aust N Z J Surg*. 1998; 68(3):190-193.
9. Stevens J.C., 1997 The electrodiagnosis of carpal tunnel syndrome. *Muscle Nerve* 20,1477-1486
10. Wildin C, Dias JJ, Heras-Palou C, Bradley MJ, Burke FD. Trends in elective hand surgery referrals from primary care. *Ann R Coll Surg Engl*. 2006; 88(6):543-546.
11. Ferry S, Pritchard T, Keenan J, Croft P, Silman AJ. Estimating the prevalence of delayed median nerve conduction in the general population. *Br J Rheumatol*. 1998; 37(6):630-635.
12. Hussein Mohammed Malibary, Afnan Tawfeeg Al-Najjar, Dina Mohammed Yassen. Clinical profile of carpal tunnel syndrome in a teaching hospital. *Pak J Med Sci* 2013; 29(1):119-121.

Source of Support: None Declared  
Conflict of Interest: None Declared