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Original Research Article

Carpal tunnel syndrome in females: pregnancy and lactation the major risk factors

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ABSTRACT

Background: Carpal Tunnel Syndrome (CTS) is the most common entrapment neuropathy. CTS is more common in the age group of 45-65 years and more common in women than men. Several factors cause CTS, including pregnancy and lactation.
Methods: The study was conducted on 60 females with carpal tunnel syndrome. Each patient was subjected to detailed history and relevant clinical examination with emphasis on elaborate neurological examination. Informed consent regarding participation into the study was taken from the patients. Patients suspected of suffering from carpal tunnel syndrome were subjected to nerve conduction study. Patients were classified into mild- moderate and severe carpal tunnel syndrome according to clinical and nerve conduction grading.
Results: Out of 60 females, 21 were pregnant (35%) and 19 were lactating (31.7%). The mean age of presentation was 44.6±14.14 years with range from 22 to 63 years. Causes were attributed to Pregnancy (35%) lactation (31.7%), hypothyroidism (18.3%), occupational risk factors (15.85%) and gout (2.4%).
Conclusions: Carpal tunnel syndrome has a high incidence in females. Sensory symptoms (paresthesia, numbness and nocturnal pain) were more common than symptoms of motor weakness. Dominant hand involvement was more common.

Keywords: Carpal tunnel syndrome, Lactation, Pregnancy, Women

INTRODUCTION

Carpal Tunnel Syndrome (CTS) is the most common entrapment neuropathy.[1,2] It is a common focal peripheral nerve compression. It has an estimated life time risk of 10% with an annual incidence of 0.1% in adults.[3] It has an estimated prevalence of 3-16% with an incidence of 139 per 1,00,000 person years for men and 506 per 1,00,000 person years for women.[1,4] CTS is more common in the age group of 45-65 years and more common in women than men.[5] Several factors cause CTS, including pregnancy and lactation.[6,7] Since almost all the females go through childbearing more than once in their lives, study on their causal or aggravation of CTS can be of value. The compression of median nerve in the carpal tunnel causes the signs and symptoms of CTS. The condition is usually bilateral, but the dominant hand seems to be more severely affected.[8] Numbness and paresthesia in the first three fingers are the classical symptom of CTS.[1] Typically, the symptoms present at night and often awakens the patient from sleep. The common symptoms include: numbness, tingling and burning in median nerve region.[2] In severe cases, there may be weakness when using hands while doing activities like turning keys, opening doorknobs or opening jar lids. In clinical examination, conventional

tests for diagnosis of CTS are the Tinels test, Phalens test and the median nerve compression test.[2] In presence of aggravation of symptoms these tests are considered to be positive. The most accurate test is the electromyogram with a sensitivity of 49-84% and a specificity of 95%.[1,2]

The treatment of CTS depends on the severity and can range from applying wrist splints to injecting corticosteroids into the carpal tunnel and eventually releasing the median nerve by surgery. Females have a higher incidence of CTS and pregnancy and lactation are risk factors and increase in intensity is seen in future pregnancies. Since invasive methods are avoided during pregnancy, early detection and treatment with noninvasive methods is of utmost importance.

Till date studies conducted on CTS in pregnant women have not used standard electrodiagnostic methods.[3,4,7] The confirmatory diagnosis of CTS is the electrophysiological study which is specific to the tune of 95%. These are performed for accurate diagnosis, to determine the exact site of entrapment and to prelude alternative diagnosis which mimic CTS in presentation.[9]

METHODS

The study was conducted on 60 females with carpal tunnel syndrome reporting to the Medical Outpatient Department of a tertiary care hospital. The study protocol was approved by the institutional ethical committee. Each patient was subjected to detailed history and relevant clinical examination with emphasis on elaborate neurological examination. Informed consent regarding participation into the study was taken from the patients. All the information regarding history and examination was recorded in case record form. Patients suspected of suffering from carpal tunnel syndrome were subjected to nerve conduction study. Patients were classified into mild, moderate and severe carpal tunnel syndrome according to clinical and nerve conduction grading.[10] Apart from electrophysiological study following investigations were performed whenever deemed necessary, CBC, Hb, ESR, T4, TSH, routine serum biochemistry.

Exclusion criteria

Patients with history of neurologic disease, hand surgery, hand trauma, diabetes mellitus, cervical spondylosis, osteoarthritis of cervical spine or wrist joint, chronic renal failure, connective tissue disorders, patients with no electrophysiological evidence of carpal tunnel syndrome and those who refused to participate in the study were excluded.

Statistical analysis

Statistical Software SPSS (version 16.0) and Microsoft Excel were used to carry out the statistical analysis of the data. A p value of <0.05 using chi- square test was considered statistically significant.

RESULTS

Out of 60 females, 21 were pregnant (35%) and 19 were lactating (31.7%). The mean age of presentation was 44.6±14.14 years with range from 22 to 63 years. Majority of the patients were in the age group of 31 to 40 years. Paraesthesias (74.39%), numbness (63.41%), pain that worsens at night (53.65%) were reported by the studied patients. Weakness of Abductor Pollicis Brevis was seen less frequently (19.51%). Thus, it was seen that sensory symptoms dominated over motor symptoms. Tinel's and Phalen's sign were positive in 48.8% and 57.3% patients respectively. Risk factors/ causes were attributed to pregnancy (35%) lactation (31.7%), hypothyroidism (18.3%), occupational risk factors (15.85%) (most common females working in fields) and gout (2.4%). In 14.63% of the patients, the cause could not be identified. Based on clinical assessment, 60% had mild to moderate CTS and 40% had severe CTS. However, as classified by NCS, there were 30% patients with mild to moderate CTS and 70% with severe CTS. So, a significant number of patients who had mild-moderate CTS on clinical grading actually had severe CTS on electro diagnostic grading (p=0.000957).

Table 1: Comparison of clinical and electro-diagnostic quantification of the severity of Carpal tunnel syndrome in patients.

Severity	Clinical grading		Nerve conduction grading	
	No.	%	No.	%
Mild to moderate	36	60	18	30
Severe	24	40	42	70
Chi square=10.909; p-value=0.000957				

Dominant hand was involved in 89.02% of the cases and bilateral CTS was present in 65.8% of the cases.

DISCUSSION

In the present study the mean age of presentation was 44.6±14.141 years with age ranging from 22 to 63 years Ali Z et al did a hospital based cross-sectional comparative study to quantify the severity of CTS clinically and electro-diagnostically and to access electro-diagnostic differences between groups with clinically mild to moderate CTS and severe CTS.[10] 66 consecutive patients were taken. Out of 66 patients of CTS, females were 72.7% and males were 27.3% and the age ranged from 22-75 years. Bahou YG did a retrospective study on 185 patients with carpal tunnel syndrome over an 18-month period.[11] The mean age of the patients was 45 years with range from 19-80 years. Bicerol B did an electrophysiological and ultrasonographic study of carpal tunnel syndrome.[12] Tay LB carried out a retrospective

study and included 134 consecutive patients with CTS and it was found that the majority of patients were females (81.3 percent).[1] In the present study, paraesthesias were present in 75.60% (n=45), numbness in 63.41% (n=38), pain that worsens at night in 53.65% (n=32) of the patients. Weakness of Abductor Pollicis Brevis was less frequent (19.51%) (n=12). These results were comparable with studies done by other researchers.[9] Ali Z et al in their study found paraesthesia (77.3%), numbness (63.6%), pain that worsens at night (56.1%), and weakness of APB in 19.7% of the patients.[10] In present study, Phalen's test was positive in 57.3% (n=34) patients and Tinel's test was positive in 48.8% (n=29) of the patients. These results are consistent with reports in the literature.[1,10] Meta-analysis have shown an average sensitivity of 68% and specificity of 73% for a positive Phalen's test.[2] A positive Tinel's sign may be less sensitive (50%) than Phalen's but has a similar specificity (77%).[2] Ali Z et al in their study found that Tinel's and Phalen's test were positive in 48.5% and 59.1% respectively.[10] Tay LB et al found paraesthesia (70.1 percent) and numbness (19.4 percent) were the presenting sensory symptoms.[1] In present study, on the basis of clinical grading, 60% (n=36) patients had mild to moderate grade and 40% (n=24) patients had severe grade of CTS. However, on Nerve Conduction Studies, 30% (n=18) patients had mild to moderate grade and 70% (n=42) patients had severe grade of CTS and this difference between clinical grading and nerve conduction grading was significant (p value = 0.000957). Dominant hand was involved in 89.02% of the cases. Bilateral CTS was present in 65.8% of the cases. These results are comparable with results of other studies.[10] Ali Z et al found that on clinical assessment, 74.3% had mild to moderate CTS and 25.7% had severe CTS.[10] However, classified by NCS, 62.1% had mild to moderate CTS and 37.9% had severe CTS and this difference between clinical grade and electrophysiological grade was significant ($p<0.01$). Bilateral CTS was seen in 68.2% of the cases and dominant hand was involved in 87.9% of the cases. In present study, pregnancy was found to be the most common cause/ risk factor for CTS (35%) (n=21), followed by lactation (31.7%) (n=19). It has been seen that hormonal fluctuations during pregnancy and lactation lead to fluid retention in the carpal tunnel leading to CTS.[13] Literature has shown that prevalence of CTS in pregnancy is significant (as high as 62%).[14] Bahrami MH et al evaluated 100 pregnant women by hand symptoms, CTS provocation tests, and standard electro diagnostic studies.[15] It was found that prevalence of CTS in pregnant women was significant (hand symptoms and clinical signs 36% and 26% respectively). In present study, hypothyroidism was found in 18.3% of the patients. In hypothyroidism there is deposition of glycosaminoglycans, hyaluronic acid and some mucopolysaccharides in subcutaneous tissues. Deposition of these substances on median nerve sheath leads to CTS.[16] The higher percentage of patients with hypothyroidism may be due to higher prevalence of hypothyroidism in India.[17] Literature also suggests that association of hypothyroidism with CTS is significant. Karpitskaya et al in 2002 found association between hypothyroidism and CTS significant (P=0.02).[18] Daniel H et al examined the relation between carpal tunnel release and diabetes mellitus, thyroid disease, inflammatory arthritis, hemodialysis, pregnancy use of corticosteroids and hormone replacement therapy.[19] It was found that hypothyroidism and CTS had significant association (OR 1.7; 95% CI 1.1, 2.8). In present study gout was found as a risk factor in 2.4% of the cases. Literature also suggests gout as an infrequent cause for Carpal Tunnel Syndrome.[3,9] It may be due to lack of patients with Tophaceous gout. Rich JT et al found that out of 2649 carpal tunnel releases, 15 hands in 13 patients had tophaceous gout in carpal tunnel with an incidence of 0.6%.[20] In present study occupational risk factors as a cause of CTS was found in 15.85% patients. These results were comparable with those found in literature.[13]

CONCLUSION

Carpal tunnel syndrome has a high incidence in females. Sensory symptoms (paraesthesia, numbness and nocturnal pain) were more common than symptoms of motor weakness. Dominant hand involvement was more common. Pregnancy and lactation were the most common co-morbid physiological risk factors/ causes for Carpal tunnel syndrome. Nerve conduction studies provide additional objective evidence in diagnosis and severity assessment of Carpal tunnel syndrome.

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