

The prevalence and severity of carpal tunnel syndrome during pregnancy

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Abstract

Background: Carpal tunnel syndrome (CTS) is the most common compression neuropathy of median nerve, which can occur or aggravate during pregnancy and sometimes needs surgery. Since early diagnosis leads to simpler and less risky treatments, this study evaluated the frequency and severity of CTS in pregnancy.

Materials and Methods: In this descriptive cross-sectional study, 100 pregnant women who came to gynecology clinic of university hospitals were randomly selected. At first, they were asked for presence of clinical symptoms, and then clinical tests including Phalen and Tinel were conducted to diagnose CTS. Then, electrodiagnostic studies including sensory and motor distal latencies of median nerve were measured and compared with those of ulnar nerve, and then, nerve conduction velocity of median nerve across wrist was evaluated.

Results: Among the studied pregnant women, 19% had CTS, out of whom 47.5% were bilateral and 26.3% had severe CTS. The prevalence in the first, second, and third trimesters were 11%, 26%, and 63%, respectively, and 42% were asymptomatic. Sensitivity and specificity of clinical signs as compared with electrodiagnostic findings were 52% and 23%, respectively.

Conclusions: The prevalence of CTS is relatively high in pregnant women. The prevalence and severity of CTS increase and the rate of asymptomatic cases reduces with the age of pregnancy. Clinical examination and history taking could not diagnose all cases, and their sensitivity and specificity are much less than electrodiagnostic tests. Therefore, it is recommended that electrodiagnostic studies be conducted in pregnant women during the third trimester.

Key Words: Carpal tunnel syndrome, electrodiagnosis, pregnancy

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INTRODUCTION

Carpal tunnel syndrome (CTS) is defined as entrapment of median nerve traveling through the carpal tunnel to the hand.^[1] The prevalence of CTS is reported differently in different studies. In the United States, general prevalence is 2.7%. The female/male ratio varies between 3:1 and 10:1. Bilateral CTS is diagnosed clinically in 78% of patients and in 50% by electrodiagnostic findings.^[2]

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Several factors cause CTS, including pregnancy.^[3,4] Since pregnancy is a physiologic phenomenon experienced by virtually all women several times, studying its effect on causing or aggravating CTS can be valuable.

Common chief complaints are numbness, tingling, and burning in median nerve region.^[2] In clinical examination, conventional tests for diagnosis of CTS are Tinel, Phalen, and median nerve compression, which cause or aggravate symptoms. The most accurate diagnostic method is electrodiagnostic tests conducted by a competent electromyographer, which has a sensitivity of 49–84% and specificity of 95%.^[1,2]

Treatment of CTS depends of the conditions and ranges from a maintenance treatment like wrist splints to invasive treatments like injecting corticosteroids in the carpal tunnel and eventually releasing the median nerve by surgery. Because women experience pregnancy several times, and if they acquire CTS, invasive treatments cannot be used, and pregnancy increases the probability of relapse of CTS in the next pregnancy with higher intensity, it is necessary to diagnose CTS in early stages and use non-invasive treatment methods.

So far, the studies conducted on CTS in pregnant women have not used standard electrodiagnostic methods.^[4-6] Furthermore, studies on CTS and pregnancy have been conducted on pregnant women in the third trimester using clinical and electrodiagnostic tests,^[7,8] which cannot be generalized to the whole pregnancy. Because there are no accurate statistics about the frequency distribution of CTS in pregnant women in Iran, we decided to study its prevalence using electrodiagnosis and then find its severity, and compare the three trimesters so an appropriate treatment plan can be proposed. Furthermore, prevalence of CTS in pregnant women based on physical examination is compared with that based on electrodiagnosis.

MATERIALS AND METHODS

In this descriptive cross-sectional study, 100 pregnant women aged 17–41 years old (mean 25.2 years) who came to Al-Zahra Hospital for routine pregnancy check-up were randomly selected disregarding their age, the gestational age, number of pregnancies, and the presence of CTS symptoms. They were referred to Physical Medicine and Rehabilitation Clinic for diagnostic tests. The inclusion criteria were pregnancy without symptoms of CTS before pregnancy. Women with a history of fracture or trauma to the hand, hypothyroidism, diabetes, or diagnosed neuropathy

were excluded. Therefore, of 128 pregnant women who came to the gynecology clinic, 28 did not enter the study because they refused to participate or had exclusion criteria. So, 100 pregnant women entered the study, and after history taking, they were examined by Phalen, Tinel, and electrodiagnostic tests. Sensory and motor distal latency of median and ulnar nerves and nerve conduction in median nerve in the wrist were measured. CTS was diagnosed on the basis of standard criteria for ulnar and median nerve conduction velocity.^[2] Then, they were divided to three groups of mild, average, and severe based on US Electrodiagnosis Society criteria for nerve conduction velocity. Therefore, 30–40 m/s, 24–29 m/s, and <24 m/s were considered mild, average, and severe, respectively.^[2]

In order to evaluate sensitivity and specificity, physical and electrodiagnostic tests were compared, and SPSS 16 software and Mann-Whitney test were used to analyze data.

RESULTS

All pregnant women were housewives of whom 47%, 36%, and 17% experienced their first, second, and third or more pregnancy, respectively; 8% were in the first trimester, 38% were in the second trimester and 54% were in the third trimester.

Of all pregnant women, 19 (19%) had CTS by electrodiagnostic criteria, of whom 9 (47.5%) had bilateral involvement. As for severity, 5 (26.3%) had severe CTS and were all in the third trimester, 4 (21.1%) had moderate involvement, and the remaining (52.6%) had mild involvement. The prevalence in the first, second, and third trimester was 11%, 26%, and 63%, respectively.

Forty pregnant women (40%) had clinical symptoms for CTS of whom 11 (27.5%) had electrodiagnostic criteria too (i.e., symptomatic CTS). Positive clinical tests (Phalen and Tinel) was seen in 29 (29%)

Table 1: Percentage of CTS in pregnant women

Criteria for CTS diagnosis	Percent	Details (Percent)
Electrodiagnosis criteria	19	26% severe, 21% moderate, 53% mild
Clinical signs	40	Phalen test and Tinel sign in 29%
Both electrodiagnostic criteria and clinical signs (symptomatic CTS)	11	18% in the first and second trimesters, 82% in the third trimester
Only electrodiagnostic criteria (subclinical CTS)	8	62% in the first and second trimesters, 38% in the third trimester

CTS = Carpal tunnel syndrome

of the pregnant women of whom 10 (34%) had electrodiagnostic CTS. Eight (42%) of those with electrodiagnostic CTS did not have any clinical signs or symptoms (i.e., subclinical CTS), of whom 5 (62%) were in the first and second trimesters, and 3 (38%) were in the third trimester. This figure for symptomatic CTS was 2 (18%) and 9 (82%), respectively [Table 1].

The sensitivity and specificity of clinical findings as compared with electrodiagnostic criteria were 52% and 23%, respectively.

DISCUSSION

In the present study, frequency of CTS by electrodiagnostic methods was 19 % (63% in third trimester), while in two other studies in the third trimester; the prevalence was 28% and 43%,^[6,7] and in another study, it was 62% in whole pregnancy period.^[9] Considering the studies that used electrodiagnosis, the results show high prevalence of CTS in pregnancy, but in those using only clinical tests, the prevalence is low. This difference shows the inaccuracy of clinical tests in diagnosing subclinical cases of CTS in pregnant women. Therefore, using the electrodiagnostic criteria are more reliable and can be used for screening. In the present study, sensitivity and specificity of clinical tests were low in comparison with electrodiagnosis. So, screening patients using only clinical criteria increases the probability of mistakes.

A study found the prevalence of CTS in pregnant women based on electrodiagnostic findings as 7–43% and based on clinical findings as 31–62%.^[10] Furthermore, CTS symptoms remained in over 50% of patients for 1 year after delivery and in 30% for 3 years after delivery. In the present study, women were not followed up after delivery, and the prevalence of CTS was higher based on electrodiagnostic findings than based on clinical findings, which is in contrast with this study.

However, another finding in our study is that 42% were asymptomatic, most of who were in the first and second trimester. This finding can be attributed to the fact that CTS is asymptomatic at the beginning and becomes symptomatic with the increase in gestational age. Therefore, it is logical to recommend electrodiagnostic tests at the beginning of pregnancy to diagnose asymptomatic cases.

Another study found the highest prevalence in the third trimester (26.6%). Furthermore, since one-third of symptomatic cases have definite electrodiagnostic criteria, it is necessary to conduct electrodiagnosis for

symptomatic cases, but in asymptomatic pregnant women (50%) there were not positive electrodiagnostic findings, so it is not necessary to do electrodiagnosis for them.^[11]

Another study found 62% of women in the third trimester with clinical symptoms of CTS, where 50% had definite diagnosis of CTS using electrodiagnosis.^[12]

In another study on 200 pregnant women in the third trimester, 28% had definite CTS diagnosis, of whom 80% were asymptomatic,^[8] which is in contrast with the findings of the previous and our studies.

As for severity of CTS, 5 women had severe symptoms, all of whom were in the third trimester. This shows the effect of duration of pregnancy on severity of CTS. The prevalence in the first, second, and third trimester was 11%, 26%, and 63%, respectively. In contrast, a study in Tabriz, Iran, found mild CTS in pregnancy,^[11] and another one found the prevalence in the first, second, and third trimester as 32%, 32%, and 35%, respectively.^[5]

In the present study, the gestational age did not have normal distribution, and most of the pregnant women were in the third trimester. It is justified by the fact that few women go to clinics in the first trimester. Another point is the prevalence of clinical symptoms in 40% of cases, which is a high prevalence in pregnant women, of whom 30% had electrodiagnostic evidence for CTS.

CONCLUSION

The results of this study show the high prevalence of CTS among pregnant women. The prevalence and severity of CTS increased with increased gestational age, and asymptomatic cases decreased. Clinical tests and history taking could not find all cases, and had little specificity and sensitivity as compared with electrodiagnosis. In sum, because clinical signs are not studied routinely in pregnant women and because of the high prevalence of CTS, it is necessary to screen all pregnant women based on their clinical signs and to use specific electrodiagnostic tests, especially in the third trimester of pregnancy.

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