Is psychological distress associated with carpal tunnel syndrome symptoms and nerve conduction study findings? A case-control study from Syria

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Abstract

Background:

Carpal tunnel syndrome (CTS) is a common entrapment neuropathy of the median nerve at the wrist which causes severe symptoms. However, psychological aspects can affect how patient perceive this pain and can cause similar pain in some instances. This study aims to determine the association between symptoms severity, functional status, and nerve conduction studies (NCS) of adult patients with carpal tunnel syndrome (CTS) and their anger, anxiety, and depression status.

Methods:

This case-control study was conducted in clinics in Damascus, Syria. Controls were frequency matched by gender and age from a general clinic. Interviews based on questionnaires were used that included Boston carpal tunnel questionnaire (BCTQ-A), Hospital Anxiety and Depression Scale (HADS), Dimensions of Anger Reactions Scale-5 (DAR-5) and Nerve Conduction Studies (NCS).

Results:

Overall, 242 patients (121 cases) were included in this study. Cases with CTS had significantly higher anxiety and depression when compared with controls, but not higher anger. Cases with higher anxiety, depression and anger had significantly more CTS symptoms and less functional status. Anxiety was also higher in cases with normal NCS in case group. When using regression, anxiety and depression remained significantly associated with having CTS.

Conclusion:

Anxiety and depression are more prominent with CTS. Furthermore, having anxiety and depression were associated with more CTS symptoms in the hand. Having anger was also associated with more CTS symptoms among cases. These findings emphasise on the importance of psychological aspects when having hand pain or CTS symptoms as these patients might have these symptoms despite having normal NCS.

Introduction

Carpal tunnel syndrome (CTS) is a common entrapment neuropathy of the median nerve at the wrist (1). Much as the name implies, the median nerve is compressed when entering the carpal tunnel, as it travels beneath the transverse carpal ligament (2). Though the underlying cause of the compression can be idiopathic, it can be attributable to a number of different factors such as malpositioning of wrist, any condition that leads to an excess fluid within the body that leads to an increased volume in the tunnel, and masses that could occupy the volume of the tunnel (3).

The nerve damage from the compression produces sensory symptoms, such as numbness, tingling, and pain within the hand. As the disease progresses, soft tissue injury occurs and disabling motor symptoms such as reduction of grip strength becomes apparent. This impairment may progress into thenar atrophy in advanced cases (2–4).

These symptoms mostly aggravate at night and have a huge negative impact on the ability to work and perform daily activities leading to an increased morbidity and being unable to attend work (1, 3, 4). They can also affect patients' quality of life and cause a deteriorating in mental health (4, 5). Moreover, psychological distress itself can intensify symptom perception, or even produce subjective symptoms resembling CTS (4, 6). The prevalence of anxiety and depression in CTS patients is 28.7% and 37.6%, respectively, which is higher than the general population (4, 7). In addition, prevalence of CTS is higher among women, usually after their sixth decade of age (8). It is speculated that decreased oestrogen antinociceptive effect caused by the decreased oestrogen concentrations is the reason behind the increased likeliness of anxiety and depression in women (7).

Since psychological distress affect CTS symptoms, diagnosis work-up and treatment program, it is important to assess the presence of association between them as it could affect patients' outcomes (4). There is still considerable controversy surrounding the association between psychological status and nerve conduction studies. (6) To our knowledge, there is a lack of studies discussing anger effect on CTS symptoms and NCS. However, some studies included the association with anxiety and other psychological aspects which we are going to discuss in this study. The aim of this study is to broaden current knowledge of the association between psychological status such as anger and anxiety and severity of CTS symptoms along with nerve conduction studies. It is noteworthy to mention that we undertook this study in Syria that has been in war for 10 years. Therefore, by taking into account the effects of war environment on mental health, our study provides special insights on CTS in war time. This is a case-control study which aims to determine the association between symptoms severity, functional status, and nerve conduction studies (NCS) of adult patients with carpal tunnel syndrome (CTS) and their anger, anxiety, and depression status.

Methods

Study design:

This case-control study was conducted at a neurophysiology outpatient clinic and general outpatient clinics at Al-Assad teaching hospital in Damascus, Syria. This study was conducted from December 2020 to June 2021. Interviews based on questionnaires were used to collect data after applying the inclusion and exclusion criteria for either the cases and controls. The interviewers were trained and aimed to facilitate data collection and explain any vague information in the questionnaires and to overcome any educational or cultural barrier that might have prevented proper understanding.

Study population:

Cases were at least 18 years old, able to give informed consent, and were diagnosed with CTS by a combination of clinical features, physical examination, and NCS findings. We excluded cases who had either a neuropathy other than CTS such as ulnar neuropathy or previous CTS surgery during the last year. Cases were frequency matched with a control group by gender and age (not more than 10 years range). Controls were selected from the general outpatient clinics at Al-Assad University Hospital provided that they had no history of previous or current nerve entrapments and did not need neurology symptoms or referrals. Any case or control who had conditions causing chronic pain was excluded other than the pain from CTS in case group.

Questionnaires:

Questionnaires included demographics such as gender, age, educational level, work, marital status, number of children, along with handedness and shisha or cigarette smoking.

The evaluation of patients with suggestive CTS symptoms was made through taking a detailed history of their condition, performing clinical examination which includes Phalen and Tinel tests, and finally confirming the diagnosis by conducting NCS.

CTS symptoms severity was assessed by asking cases to complete the Arabic version of Boston carpal tunnel questionnaire (BCTQ-A). Boston carpal tunnel questionnaire (BCTQ) is a self-report questionnaire that records symptom severity and functional status in CTS patients (9). It represents CTS severity in the last 2 weeks and consists of two scales; the first one is the symptom severity scale (SSS) that has 11 items that cover 6 domains include: pain, numbness, nocturnal symptoms, paraesthesia, weakness, and functional status. Its score ranges from 1 to 5 which is the most severe. The second one is functional status scale (FSS) that has 8 functional activities that are commonly affected by CTS (difficulty in writing, buttoning clothes, opening jars, holding a book, gripping a telephone handle, performing household chores, carrying grocery bags, bathing, and dressing). The scores also range from 1 to 5 which represents not being able to perform the activity at all (10). Since many patients were illiterate, we had to change the question asking about difficulties of writing or holding a book while reading to difficulties of using cutlery during their meals or holding their plate while eating, respectively.

Hospital Anxiety and Depression Scale (HADS) was also used which is a brief, clinically meaningful scale that screens for the levels of anxiety and depression in clinics. The limitation of this version that it does not have somatic symptoms of depression to reduce the effect of the current medical condition(s) on the scores. It consists of two subscales and scores can predict the psychosocial and physical outcomes. HADS has 14 items as anxiety and depression has 7 items each. Each item scored on a four-point scale ranging from 0 to 3 and the maximum score for each subscale is 21. Scores that range from 0- 7 are considered normal while 8-10 are considered borderline, and 11-21 are considered as anxiety or depression cases (11, 12).

Dimensions of Anger Reactions Scale-5 (DAR-5) is used to assess for problematic anger. It is a mini screening measure of anger reactions for the past 4 weeks. It assesses frequency, intensity, and duration

of anger, antagonism toward others, and social relations interference. Scores of each item range from 1 (None or almost none of the time) to 5 (All or almost all of the time). Total scores above 12 are considered as problematic anger (13, 14).

Nerve Conduction Studies (NCS): Median distal motor latency (DML) and median sensory NCS (between the wrist and digit, between the wrist and palm) are of the best NCS tests to evaluate CTS according to a literature review of the American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM) (8). Of these tests, distal motor latency (DML) and distal sensory latency (DSL) are the most popular ones so that we used them along with other tests such as sensory nerve conduction velocity (NCV) and amplitude in order to increase the sensitivity and specificity of our tests. The sensory conduction study was performed by placing an active electrode on the index at a distance of 13-14 cm from a stimulator in the middle of the wrist. We also stimulated the median nerve at the palm. While the motor conduction study was done by placing an active electrode on the belly of the abductor pollicis brevis (APB) muscle. We stimulated the median nerve at the wrist at a distance of 4-6 cm from the active electrode.

Neurophysiological grading of CTS was done based on the study of (Bland, 2000) (5, 15) :

Grade 0: normal (absence of abnormal neurophysiological findings)

Grade 1: very mild (NCV from index to wrist $< 50\text{m/s}$ and $\geq 40\text{ m/s}$, DML from wrist to abductor pollicis brevis [APB] $> 4.0\text{ ms}$)

Grade 2: mild (NCV from index to wrist $< 40\text{ m/s}$, DML [APB] $< 4.5\text{ ms}$)

Grade 3: moderate (DML [APB] $> 4.5\text{ ms}$ and $< 6.5\text{ ms}$ with normal index finger sensory nerve action potential [SNAP])

Grade 4: severe (DML [APB] $> 4.5\text{ ms}$ and $< 6.5\text{ ms}$ with absent index [SNAP])

Grade 5: very severe (DML [APB] $> 6.5\text{ ms}$)

Grade 6: extremely severe (motor nerve action potential (MNAP) [APB] $< 0.2\text{ mV}$)

Definitions:

The classification of clinical symptoms such as numbness, tingling or pain depended on the location where the patient experiences these symptoms. It comprised 4 categories: classic, probable, possible, and unlikely which represent the following patterns of symptoms: two of three fingers (thumb, index, and long) without involvement of the palm or hand dorsum, two of three fingers (thumb, index, and long) and the palm but no confinement to the ulnar side, one of three fingers (thumb, index, and long), and none of three fingers, respectively (8, 16).

Tinel's test result is considered positive if patients display CTS symptoms while the examiner is percussing the median nerve over the along the carpal tunnel (3, 8). In comparison, the result of Phalen's manoeuvre by which patients flex the wrist vertically is described as positive if the patient experiences symptoms in the distribution of the median nerve (3, 8).

Statistical analysis:

Statistical analysis was performed using the Statistical Package for Social Science (SPSS 25). Descriptive statistics were stated as the mean and standard deviation, frequency and percentage. Chi-square test (or exact test) were performed for comparing categorical data and Student's *t*-test or one-way analysis of variance (ANOVA) for continuous variables as appropriate. Pearson's correlations were used to evaluate relationships between variables. A *p*-value of less than 0.05 was considered significant.

Ethics:

The study was approved by the local ethics committee of Damascus University, faculty of medicine.

Results

A total of 242 patients participated in this study, 121 cases and 121 controls. Each group has 96 females and 25 males. Mean age was 43.95 years $\pm$ 13.38 in cases and 43.12 years $\pm$ 13.19 in controls. There is no difference in the mean age between cases and controls since the groups were frequency matched by gender and age. Most patients in both groups were right-handed (93.4% in cases, 86% in controls). The predominant level of education was elementary (26.4%) in cases and College education (32.2%) in controls. Housewives were 61.2% in CTS patients compared to 41.3% in controls. Demographic variables were summarized in **(Table 1)**. When using forward linear regression to regress anxiety score on case-control groups, education and working status, case control was significant with $p < 0.001$ and R^2 of 6.2% and work with $p = 0.004$ and R^2 of 9.4%. When using the same methods to regress depression score, case-control was significant with $p < 0.001$ and R^2 of 7.8%, work with $p = 0.004$ and R^2 of 10.9%, and education with $p = 0.022$ and R^2 of 12.9%. However, when using the same method to regress anger, only work was significant with $p = 0.025$ and R^2 of 1.7%.

The percentage of symptoms' patterns, as described by CTS patients, are: classic (18.2%), probable (65.3%), possible (6.6%), and unlikely (9.9%). Based on the results from the BCTQ-A symptom severity scale, patients were classified into asymptomatic (1.7%), mild (41.3%), moderate (34.7%), severe (20.7%), and very severe (1.7%). The data was also classified according to BCTQ-A functional status scale into asymptomatic (13.2%), mild (33.9%), moderate (33.1%), severe (15.7%), and very severe (4.1%) **(Fig. 1)**. Finally, 57 (47.1%) of CTS patients had a positive Tinel sign and 45 (37.2%) had a positive Phalen sign.

In case group, no statistically significant difference was found between left and right hand in terms of nerve conduction studies except in sensory median nerve amplitude. It is noteworthy to mention that 31.4% of NCS in both hands showed normal results among cases. **(Table 2)**

A statistically significant difference was found between cases and controls in terms of anxiety and depression. In contrast, the mean of the anger scale was not statistically different between the two groups. Both groups have DAR-5 scores greater than 12. In comparison with cases, the percentages of normal anxiety and depression scores as well as mild ones were higher in controls (74.4% for anxiety and 83.4% for depression). Based on the HADS score for anxiety and depression, severe scores were higher in cases in comparison with controls. Psychological factors and their association with CTS are summarized in **(Table 3)**.

The patients with normal nerve conduction study had the highest mean of anxiety among other NCS groups. However, the difference between groups was only statistically significant in left hand **(Table 4)**.

The positive correlation between psychological factors and self-reported questionnaires was statistically significant: BCTQ-A SSS with anxiety ($r = 0.295$, $p = 0.001$), BCTQ-A SSS with depression ($r = 0.287$, $p = 0.001$), BCTQ-A SSS with anger ($r = 0.284$, $p = 0.002$), BCTQ-A FSS with anxiety ($r = 0.297$, $p = 0.001$), BCTQ-A FSS with depression ($r = 0.293$, $p = 0.001$), and BCTQ-A FSS with anger ($r = 0.181$, $p = 0.047$) **(Table 5)**.

A negative correlation was demonstrated between anxiety and both right and left distal motor latency (DML) ($r = -0.206$, $p = 0.029$), ($r = -0.186$, $p = 0.044$), whereas a positive correlation was found between left sensory nerve conduction velocity (NCV) and both anxiety and depression ($r = 0.246$, $p = 0.008$), ($r = 0.192$, $p = 0.038$). These results suggest the existence of an inverse relationship between anxiety and distal motor latency (DML) which indicates that the increase of distal motor latency was associated with the decrease of anxiety. **(Table 5)**

Discussion

This study found a strong association between CTS symptoms severity along with functional status and anxiety, depression, and anger. In regard to anger, this study surprisingly revealed that both cases and controls have problematic anger and no significant difference between them was found. Furthermore, there was no correlation between anger and NCS. However, regarding anxiety and depression, controls have more normal and milder anxiety and depression when compared with cases of CTS who had more severe anxiety and depression. Anxiety was correlated with milder NCS as it had an inverse correlation with DML in both hands and a positive correlation with sensory NCV in left hand only. On the other hand, depression had a weak correlation with NCS as it does not relate to DML and its positive correlation with sensory NCV was only significant to left hands.

This study confirms previous findings (7, 17, 18) that anxiety and depression were more prevalent in CTS patients, but this finding should be interpreted with caution as these studies used different tools other than HADS to either calculate or estimate the percentage of prevalence. For instance, Paiva Filho et al. (2020) (7) used DSM-5 criteria to confirm the diagnosis of anxiety and depression, Moghadam-Ahmadi et al. (2017) (17) administered Beck Anxiety Inventory (BAI), and Beleckas et al. (2018) (18) used Patient-Reported Outcomes Measurement Information System (PROMIS). In addition, the prevalence of anxiety

and depression in CTS patients were higher than that reported by Paiva Filho et al. (2020) (7) and Beleckas et al. (2018) (18); this may be explained by the war environment of Syria, where the study took place.

Our study is consistent with previous research (19) regarding the strong association between CTS symptoms severity along with functional status and anxiety and depression. However, these results differ slightly from an earlier study reported by YH Shin (20) who states that only CTS symptoms severity is associated with depression and anxiety. Papadopoulou et al. (2021) (6) reports interestingly that depression lessened following improvement of CTS symptoms. Our study disagrees with Moghadam-Ahmadi et al. (2017) and Papadopoulou et al. (2021) (6) studies' findings disproving the association, too (17).

Although it is believed that having more severe symptoms is associated with a greater underlying pathophysiology, this is mostly not true with pain (21) since many studies demonstrate that psychological distress act synergistically on pathophysiology at a personal level and there is a positive correlation between this distress and CTS, as well (22). Since association does not mean causation, the limitation of our study is that it does not investigate whether CTS causes psychological distress or vice versa is true.

The inverse association between anxiety and distal motor latency indicate that anxiety is more associated with normal to mild electrodiagnostic CTS grades than moderate to severe grades. The positive correlation between anxiety and sensory NCV in left hand also supports the mentioned association. This is consistent with other case control study results that found patients with only CTS symptoms without electrodiagnostic (EDX) conformation had the highest mean of HADS anxiety score. However, this study reported that patients with normal EDX have also the highest HADS depression score in contrast to our study in which depression was not significantly correlated with nerve conduction study except for left hand conduction velocity (4). Psychological factors were related to clinical scales but not EDX results in other research studies (6, 23).

Psychological support should be offered for CTS patients with mild nerve conduction studies in case positive anxiety and depression were found (23).

Research on anger's relationship with CTS lags far behind studying that of anxiety and depression with CTS. To the best of our knowledge, there are no studies in the literature that explore the association of self-reported anger with symptom severity and functional status in patients with carpal tunnel syndrome. Our study reveals that both case and control groups have problematic anger which may be attributable to the traumatic war environment in Syria (14). There were significant positive correlations between anger and both symptom severity and functional status in our study. In general, the association between pain and anger was highly reported in previous studies. Anger exacerbates pain intensity both chronic and acute conditions (24, 25) and vice versa was true as a systematic review stated that patients experiencing chronic pain reported higher degrees of anger in comparison with controls (26). This study provides a new insight into anger as its association with CTS is never studied before.

Our study did not come with no limitations. The questionnaires of assessing psychological status cannot substitute clinical diagnosis by medical professionals. Having other factors such as work and education could also affect the results. Finally, a larger sample size could also help more to determine more the differences between the groups which was not feasible in our study.

In conclusion, there is a strong association between psychological aspects of anger, anxiety, and depression and symptoms severity and functional status of CTS patients. Having CTS symptoms with normal NCS was associated with higher anxiety and depression score. These findings emphasise on the importance of psychological aspects when having hand pain or CTS symptoms. Further studies are needed to evaluate the association between anger and CTS symptoms.

Declarations

- **Ethics approval and consent to participate:**

Informed consent was taken from cases and controls, and for using and publishing the data. Confidentiality was assured and no data indicative to the person were collected. Our study protocol and ethical aspects were reviewed and approved by Damascus University, Damascus, Syria.

- **Consent for publication:**

Written consent for using and publishing the data was taken before participating in the research.

- **Availability of data and materials:**

The data can be made available upon reasonable request.

- **Competing interests:**

We have no conflict of interest to declare.

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Author contribution:

AA: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Validation; original draft; Writing - review & editing.

AAH: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Validation; original draft; Writing - review & editing.

YD: Software; Resources; Conceptualization; Project administration; Supervision; Validation.

LAH: Software; Investigation; Project administration.

OA: Software; Investigation; Project administration.

AK: Conceptualization; Formal analysis; Methodology; Project administration; Supervision; Resources; Validation; original draft; Writing - review & editing.

Abbreviations

AANEM	American Association of Neuromuscular and Electrodiagnostic Medicine
ANOVA	Analysis of variance
BCTQ SSS	Boston Carpal Tunnel Questionnaire-Symptom Severity Scale
BCTQ FSS	Boston Carpal Tunnel Questionnaire Function Status Scale
CTS	Carpal Tunnel Syndrome
DAR-5	Dimensions of anger reaction 5
DML	Distal Motor Latency
DSL	Distal sensory latency
DSM	Diagnostic and Statistical Manual of Mental Disorders
EDX	Electrodiagnostic
HADS	Hospital Anxiety and Depression Scale
NCS	Nerve Conduction Studies
NCV	Nerve Conduction Velocity
SPSS	Statistical Package for Social Science

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Tables

Table 1 Comparison of demographic characteristics between cases and controls			
Characteristic	Cases (121)	Controls (121)	<i>p</i> -Value
Age, years			
Mean $\pm$ SD	43.95 $\pm$ 13.38	43.12 $\pm$ 13.19	0.629*
Gender			
Women	96 (79.3)	96 (79.3)	
Men	25 (20.7)	25 (20.7)	
Dominant handed			
Right	113 (93.4)	104 (86)	0.057**
Left	8 (6.6)	17 (14)	
Education			
Illiterate	25 (20.7)	5 (4.1)	<0.001**
Elementary	32 (26.4)	25 (20.7)	
Primary	24 (19.8)	31 (25.6)	
Secondary	20 (16.5)	17 (14)	
College	20 (16.5)	39 (32.2)	
Masters and PhD	0 (0)	4 (3.3)	
Work			
Jobless	11 (9.1)	14 (11.6)	0.004**
Housewife	74 (61.2)	50 (41.3)	
Farmer	5 (4.1)	1 (0.8)	
Teacher	4 (3.3)	10 (8.3)	
Employee	14 (11.6)	20 (16.5)	
Domestic manager	1 (0.8)	0 (0)	
Barber and Tailor	1 (0.8)	9 (7.4)	
Carpenter and painter	4 (3.3)	3 (2.5)	
Health care	1 (0.8)	7 (5.8)	
Merchant	4 (3.3)	6 (5)	
Driver	2 (1.7)	1 (0.8)	

Marital Status			
Single	14 (11.6)	25 (20.7)	0.211**
Married	104 (86)	92 (76)	
Divorced	2 (1.7)	2 (1.7)	
Widow	1 (0.8)	2 (1.7)	
Number of children			
Mean± SD	4.32 ±3.1	2.88 ±2.68	<0.001*
Cigarette smoking			
Yes	28 (23.1)	27 (22.3)	0.878**
No	93 (76.9)	94 (77.7)	
Hookah smoking			
Yes	14 (11.6)	18 (14.9)	.448**
No	107 (88.4)	103 (85.1)	

*Student's *t*-test

**Chi-square test (or exact test)

BCTQ SSS: Boston Carpal Tunnel Questionnaire-Symptom severity scale; BCTQ FSS: Boston Carpal Tunnel Questionnaire-Function status scale

Table 2 Comparison of Nerve Conduction Studies between right and left hands			
	Left	Right	p-Value
Distal Sensory Latency			
Mean $\pm$ SD	3.2 $\pm$ 0.58	3.3 $\pm$ 0.70	0.400*
Sensory Nerve Amplitude			
Mean $\pm$ SD	40.35 $\pm$ 21.52	34.84 $\pm$ 20.70	0.049*
Sensory Nerve Conduction Velocity			
Mean $\pm$ SD	44 $\pm$ 6.56	43 $\pm$ 7.13	0.267*
Distal Motor Latency			
Mean $\pm$ SD	3.92 $\pm$.95	4 $\pm$ 0.94	0.580*
Motor Nerve Amplitude			
Mean $\pm$ SD	11.22 $\pm$ 4	11.29 $\pm$ 6	0.924*
Nerve conduction study grading			
Normal	19 (15.7)	19 (15.7)	0.640**
Very mild	70 (57.9)	59 (48.8)	
Mild	10 (8.3)	14 (11.6)	
Moderate	15 (12.4)	18 (14.9)	
Severe	0 (0)	0 (0)	
Very Severe	2 (1.7)	4 (3.3)	
Extremely Severe	0	0	

*Student's *t*-test

**Chi-square test (or exact test)

Table 3 Comparison of Psychological Factors between cases and controls			
	Cases	Controls	p-value
HADS-Anxiety			
Mean ±SD	10.12 ±5.22	7.55 ±4.77	<0.001*
HADS-Depression			
Mean ±SD	9.59 ±5.25	6.95 ±3.78	<0.001*
DAR-5 Anger			
Mean ±SD	13.97 ±5.56	12.76 ±4.53	0.065*
HADS-Anxiety Grading			
Normal	46 (38%)	68 (56.2%)	0.010**
Mild	20 (16.5%)	22 (18.2%)	
Moderate	27 (22.3%)	17 (14%)	
Severe	28 (23.1%)	14 (11.6%)	
HADS-Depression Grading			
Normal	43 (35.5%)	69 (57%)	<0.001**
Mild	27 (22.3%)	32 (26.4%)	
Moderate	25 (20.7%)	16 (13.2%)	
Severe	26 (21.5%)	4 (3.3%)	

HADS, Hospital Anxiety and Depression Scale; DAR-5, Dimensions of Anger Reactions Scale-5

*Independent *t*-test was used.

**Chi-square test was used.

Table 4 Factors associated with the result of nerve conduction study		
	Anxiety	Depression
Left hand EDX grading		
Normal	13.47 ±4.50	11.89 ±5.12
Very mild	9.97 ±5.49	9.80 ±5
Mild	9.60 ±4.30	8.20 ±5.15
Moderate	8.53 ±4.47	8.40 ±6.03
Very severe	7 ±1.41	6 ±7.07
<i>P-value</i>	0.039[#]	0.193 [#]
Right hand EDX grading		
Normal	12.16 ±4.40	10.42 ±5.54
Very mild	10.10 ±5.53	9.61 ±4.94
Mild	9.86 ±5.25	11.07 ±5.39
Moderate	8.61 ±4.03	6.56 ±3.91
Very severe	7 ±.82	11.25 ±7.41
<i>P-value</i>	0.186 [#]	0.078 [#]

HADS, Hospital Anxiety and Depression Scale; EDX: Electrodiagnostic

One-way ANOVA test

Table 5 Correlations between psychological factors, BCTQ questionnaire and nerve conduction study [#]		
Variables	Pearson correlation (<i>P</i>)	p-Value
BCTQ SSS vs HADS-Anxiety	0.295	0.001
BCTQ SSS vs HADS-Depression	0.287	0.001
BCTQ SSS vs DAR-5 Anger	0.284	0.002
BCTQ FSS vs HADS-Anxiety	0.297	0.001
BCTQ FSS vs HADS-Depression	0.293	0.001
BCTQ FSS vs DAR-5 Anger	0.181	0.047
HADS-Anxiety vs Left sensory NCV	0.246	0.008
HADS-Anxiety vs Left DML	-0.186	0.044
HADS-Depression vs Left sensory NCV	0.192	0.038
HADS-Depression vs Left DML	-0.171	0.066
DAR-5 Anger vs Left sensory NCV	0.150	0.107
DAR-5 Anger vs Left DML	-0.083	0.373
HADS-Anxiety vs Right sensory NCV	0.183	0.052
HADS-Anxiety vs Right DML	-0.206	0.029
HADS-Depression vs Right sensory NCV	0.071	0.455
HADS-Depression vs Right DML	-0.102	0.284
DAR-5 Anger vs Right sensory NCV	0.121	0.201
DAR-5 Anger vs Right DML	-0.107	0.258

BCTQ SSS: Boston Carpal Tunnel Questionnaire-Symptom Severity Scale; BCTQ FSS: Boston Carpal Tunnel Questionnaire Function Status Scale; DAR-5: Dimensions of anger reaction 5; DML: Distal Motor Latency; HADS: Hospital Anxiety and Depression Scale; NCV: Nerve Conduction Velocity.

Nerve conductive study was conducted in only case group.

Significant values were in bold font.

Figures

Figure 1

showing CTS symptoms classification, BCTQ-A SSS and BCTQ-A FSS according to gender.