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Carpal tunnel syndrome and nerve conduction studies in fibromyalgia patients

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Abstract

Introduction: The aim of this study is to evaluate ENMG results of female patients with Fibromyalgia Syndrome (FMS) with a preliminary diagnosis of carpal tunnel syndrome (CTS) and to examine whether there are differences in ENMG results compared to control group.

Material and methods: Ethical approval was obtained for this study on 30.12.2022 with number E. Kurul-2022-20/32 and recorded retrospectively between January 2021 and January 2023. 201 female patients who were diagnosed with FMS in Physical Therapy and Rehabilitation polyclinic and who were requested to have ENMG testing with a preliminary diagnosis of CTS were included in study as patient group. 201 patients were ıncluded as control group.

Results: While the number of patients with right CTS was 39 (25.49%) in the FMS group, the number of patients with right CTS was 38 (24.20%) in control group. While the number of patients with left CTS was 34 (25%) in the FMS group, number of patients with left CTS in the control group was 36 (24.65%). When we analyzed a total of 592 ENMG results in our study, we found a high normal ENMG rate of 75%.

Conclusion: We found that there was no difference between the FMS and the control group in terms of compatibility between the pre-diagnosis and electroneurophysiological diagnosis in the ENMG results requested with the pre-diagnosis of CTS in our study. The ENMG examination should be requested for right patient in right indication, by first evaluating the patient well.

Key words: Fibromyalgia Syndrome, Carpal Tunnel Syndrome, Nerve Conduction Studies, Preliminary Diagnosis, Compatibility.

What is new? What is important?

- FMS and CTS are more common in middle aged women; paresthesia and sensory complaints may mimic CTS in patients with FMS.
- We found that there was no statistically significant difference between the FMS and the control group in terms of compatibility between the pre-diagnosis and electroneurophysiological diagnosis in the ENMG testing.
- We found a high normal ENMG rate of 75%.
- Inadequate anamnesis, physical examination or inappropriate requests may reduce the value of electroneurophysiological studies, causing unnecessary patient density, prolonged ENMG appointments, and waste of time and effort.
- ENMG examination should be requested for the right patient in the right indication, evaluating the patient well at first.

INTRODUCTION

Fibromyalgia Syndrome (FMS) is a disease in which widespread pain in soft tissues is the leading role, accompanied by other somatic symptoms, especially fatigue, sleep disorders, and tenderness in soft tissues [1]. Although it is more common in women, its prevalence in Turkey was found to be 3.9–5.6% [2, 3]. The etiology and pathogenesis of the disease have not been clearly explained yet, and it is thought to be multifactorial. FMS causes physical and emotional deterioration in the patient's quality of life and difficulty in performing activities of daily living. Along with pain, which is the main symptom of the disease, other symptoms also contribute to this condition. Diagnostic criteria for the diagnosis of the disease have changed and developed over the years, but a gold standard diagnostic method has not been established yet. Until the pathophysiology is better elucidated and biomarkers are identified, the diagnosis will remain dependent on patient reporting and clinical assessment [4].

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Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy in the upper extremity [5]. It develops after the median nerve is trapped in the carpal tunnel in the wrist. It causes problems in the daily life of the person by causing pain, numbness, and tingling [6]. CTS is more common in middle-aged female patients. Its higher incidence in women has been explained by hormonal changes and the anatomical narrowing of the carpal tunnel in women. Occupations that require frequent use of the hands (musicians, computer typewriters, carpenters, factory workers, needle workers, tennis players) and certain diseases or conditions (pregnancy, rheumatoid arthritis, chronic renal failure, diabetes mellitus, wrist trauma, amyloidosis, tumors, tendinitis, and tenosynovitis) are other causes of CTS [7].

The diagnosis of CTS can be made by anamnesis and clinical examination. The gold standard test supporting the diagnosis is electrophysiological evaluation. Electroneuromyography (ENMG) is a test that provides information about the suspected neuromuscular disorder and it helps in the diagnosis and treatment of the disease when performed with appropriate protocols. The disadvantages are the disturbing electrical stimulations given to the patient during the procedure and the painful recordings with needle electrodes. It is also a subjective examination, the result of which may vary depending on the practitioner's personal experience [8]. In addition, the electrophysiological studies do not provide sufficient information for structural and anatomical status and etiological cause [9]. The better the clinical evaluation is done, and the more accurate preliminary diagnosis is established, the more consistent results will be obtained, and the greater the clinical benefit will be.

FMS and CTS are more common in both women and middle age, so these two diseases can coexist or mimic each other's symptoms. Paresthesia symptoms in the extremities are seen in 26–84% of patients with FMS and can be confused with entrapment neuropathies in the differential diagnosis [10]. The prevalence of CTS in FM was determined by Sarmer *et al.* 10%, Ersöz *et al.* 15%, Nacır *et al.* 20.6%, and Silva *et al.* 19.5% [10–13]. Polyneuropathy, muscle denervation, and electrodiagnostic features of chronic inflammatory demyelinating polyneuropathy were found to be common in FMS in a review of ENMG results compiled from the largest FMS cohort [14] .

The aim of this study is to evaluate the ENMG results in female patients with FMS with a preliminary diagnosis of carpal tunnel syndrome and to examine whether there are differences in ENMG results compared to the control group.

MATERIAL AND METHODS

STUDY DESIGN

This retrospective study was undertaken between January 2021 and January 2023. Acibadem Mehmet Ali Aydinlar University Medical Research Evaluation Committee approval was obtained before starting the study (E.Kurul 2022-20/32).

Patients

201 female patients who were diagnosed with FMS in the Yozgat City Hospital Physical Therapy and Rehabilitation polyclinic and who were requested to have ENMG testing with a preliminary diagnosis of CTS were included in the study as the patient group. 201 female patients who had a similar mean age to the patient group, who did not have any chronic disease, and who underwent ENMG testing in the ENMG laboratory with a preliminary diagnosis of CTS were included in the study as the control group. The cases with a history of pregnancy and disease or events that may cause secondary CTS such as previous wrist fracture, inflammatory rheumatic disease, diabetes mellitus, and hypothyroidism were not included in the study. In addition, the patients with neurological diseases that may cause neuropathy were also excluded from the study.

Demographic information such as age and the electroneurophysiological results of the patients were recorded in detail.

Statistical analysis

All analyses were carried out with SPSS 26.0 (IBM, USA). The findings of the study are expressed as frequency and percentages. Normality analysis was carried out using the Kolmogorov-Smirnov test. The variables that did not normally distribute are presented as the median and interquartile range (IQR) with 25–75th percentiles. Descriptive statistics mean and standard deviation (mean±SD) were used for normally distributed variables, mean and minimum-maximum values were used for non-normally distributed variables. Numeric dependent variables with abnormal distribution were compared with the Mann-Whitney U test. Categorical variables were compared using the Chi-Square test.

RESULTS

A total of 402 female patients who underwent ENMG with a preliminary diagnosis of CTS were included in the study. 201 patients were assigned as the FMS group and 201 patients as the control group. The mean age of patients in the FMS group was 43.87±6.23 years, while the mean age of patients in the control group was 42.49±8.29 years, and there was no significant difference between the groups in terms of mean age (p: 0.061). In ENMG testing, right CTS was studied in 310 patients and left CTS in 282 patients. While the number of patients with right CTS was 77 (24.8%) out of 310 patients, the number of patients with left CTS was 70 (24.8%) in 282 patients in total. (Table 1)

ENMG was studied for right CTS in 153 patients in the FMS group and for left CTS in 136 patients. ENMG was studied for right CTS in 157 patients in the control group and for left CTS in 146 patients. While the number of patients with right CTS was 39 (25.49%) in 153 patients in the FMS group, the number of patients with right CTS was 38 (24.20%) in 157 patients in the control group. There was no significant difference between the groups in terms of the percentage of patients with right CTS. While the number of patients with left CTS was 34 (25%) in 136 patients in the FMS group in which ENMG was studied, the number of patients with left CTS was 36 (24.65%) in 146 patients in the control group, and there was no significant difference between the groups in terms of the percentage of left CTS patients.

The results and significance values of the conduction studies are given in Table 2; there was no statistically significant difference in these values between the FMS and the control groups. (Table 2)

DISCUSSION

Paresthesia and complaints related to sensory changes are also symptoms observed in approximately 80% of FMS patients. CTS is the most common entrapment neuropathy, and it is a clinical syndrome with paresthesia and pain complaints such as numbness, tingling, tingling and burning sensation. Paresthesia and hand pain, especially at night, and morning stiffness are the findings that can be observed in both CTS and FMS. We aimed to show how the coexistence of these two diseases with similar symptoms and similar age and gender weights affects the ENMG results.

Paresthesia and sensory complaints were found to be significantly higher in the FMS group in a study in which 50 patients with FMS were compared to the control group. In the electrophysiological examination, although there was no statistically significant difference between the groups in terms of the diagnostic rates of CTS, CTS was detected at a rate of 10% in the FM group and 4% in the control group [12]. When the results of the nerve conduction study of 17 FMS patients with paresthesia in their extremities were compared to the control group in a prospective study, results consistent with CTS were obtained at a rate of 15% in the FMS group and 5.9% in the control group, and no statistically significant difference was found [11]. 63 FMS patients were compared to the control group in another study, CTS prevalence was found to be 20.63% in the FMS group and 2.82% in the control group, and the results were statistically significant [10]. In our study, unlike the first three studies, we found the CTS rate to be approximately 25% and similar between the FMS and control groups. We think the frequency rate we found in our study is more valid since the number of our patients is much higher than the number of patients in other studies.

In a study conducted in 2020, 30 CTS-positive and 25 CTS-negative patients with numbness in the hands were examined. FMS was detected in 26.7% of those with CTS and 24% of those without CTS, and there was found no statistically significant difference between these two groups. When the two groups with and without FMS were compared, median nerve conduction velocities were found to be significantly slower in the group without FMS, and electrophysiological confirmation was recommended for the diagnosis of CTS in FMS patients [15]. Unlike this study, there was no statistically significant difference in ENMG results between the FMS and the control groups in our study. We do not consider the difference realistic as the number of patients in their study was small.

In the literature, normal results of electroneurophysiological studies in FMS patients are frequently encountered at very high rates. Normal electroneurophysiological study rates were found to be between 16–38% in different studies [16–18]. Sarman et al. found a normal ENMG rate of 50.4% in their study, which examined a total of 498 ENMG results [19]. 400 electroneurophysiological studies performed with the prediagnosis of peripheral neuropathy were examined in terms of compatibility of the prediagnosis with the electroneurophysiological diagnosis in a retrospective study conducted in 2019. 47.25% of the electroneurophysiological

studies performed in the ENMG Unit were found to be normal [20]. When we analyzed a total of 592 ENMG results in our study, we found a high normal ENMG rate of 75%. Unlike the literature, we attributed the high normal ENMG result we found in our study to the lack of adequate neurological and clinical examination before the ENMG testing request. Also, electroneurophysiological studies are useful for the differential diagnosis of FMS and other diseases like myofascial pain syndrome, trap neuropathy, and polyneuropathy. In such cases, a normal electroneurophysiological study also helps in excluding the other causes and it allows us to guide the treatment.

Table 1

Carpal Tunnel Syndrome Frequencies

	Fibromyalgia	**Fibromyalgia**	**Control**	**Control**
CTS Frequency	N	%	N	%
Left CTS absent	136	82%	117	80,2%
Left CTS present	30	18%	29	19,8%
Total	166	100	146	100
Right CTS absent	116	75,4%	124	79%
Right CTS present	38	24,6%	33	21%
Total	154	100	157	100

***N:** Number, **CTS:** Carpal tunnel syndrome*

Table 2

Results of the conduction studies and significance values

		N	**Mean**	**Std Deviation**	**P value**
Left Median Motor Latency (Wrist)	FMS-	127	4,16 ms	1,17 ms	0.287
	FMS +	117	4,34 ms	1,44 ms	
Left Median Motor Velocity	FMS -	92	56,11 m/sn	9,37 m/sn	0.363
	FMS +	89	57,35 m/sn	8,91 m/sn	
Left Median Motor Amplitude (Wrist)	FMS -	127	9,38 mV	2,91 mV	0.919
	FMS +	117	9,42 mV	3,22 mV	
Right Median Motor Latency (Wrist)	FMS -	157	4,09 ms	1,22 ms	0.738
	FMS +	156	4,14 ms	1,50 ms	
Right Median Motor Amplitude (Wrist)	FMS -	157	9,96 mV	3,29 mV	0.464
	FMS +	157	10,22 mV	3,13 mV	
Right Median Motor Velocity	FMS -	114	55,47 m/sn	9,34 m/sn	0.547
	FMS +	124	56,21 m/sn	9,55 m/sn	
Left Median Sensory Latency	FMS -	146	3,00 ms	1,21 ms	0.700
	FMS +	136	2,96 ms	0,77 ms	
Left Median Sensory Amplitude (Wrist)	FMS -	146	29,75 µV	13,68 µV	0.271
	FMS +	136	31,50 µV	13,02 µV	
Left Median Sensory Velocity	FMS -	145	49,06 m/sn	12,08 m/sn	0.211
	FMS +	135	50,72 m/sn	9,78 m/sn	
Right Median Sensory Latency	FMS -	157	2,97 ms	1,12 ms	0.807
	FMS +	153	3,00 ms	0,72 ms	
Right Median Sensory Amplitude (Wrist)	FMS-	157	30,62 µV	12,95 µV	0.526
	FMS+	153	31,56 µV	12,99 µV	
Right Median Sensory Velocity	FMS -	156	49,25 m/sn	12,33 m/sn	0.637
	FMS +	152	49,84 m/sn	9,42 m/sn	

***N:** Number, **FMS:** Fibromyalgia Syndrome*

LIMITATIONS

The limitations of the study were the retrospective nature of the study and the inability to evaluate the effect of CTS diagnosis on disease activity and prognosis in patients with FMS.

CONCLUSION

FMS and CTS are more common in middle aged women; paresthesia and sensory complaints may mimic CTS in patients with FMS. We found that there was no statistically significant difference between the FMS and the control group in terms of compatibility between the pre-diagnosis and electroneurophysiological diagnosis in the ENMG testing. We found a high normal ENMG rate of 75%. Inadequate anamnesis, physical examination or inappropriate requests may reduce the value of electroneurophysiological studies, causing unnecessary patient density, prolonged ENMG appointments, and waste of time and effort. The ENMG examination should be requested for the right patient in the right indication, evaluating the patient well at first.

Introducere: Scopul acestui studiu este de a evalua rezultatele EMG ale pacienților de sex feminin cu sindrom fibromialgic (FMS) cu un diagnostic preliminar de sindrom de tunel carpian (CTS) și de a examina dacă există diferențe în rezultatele EMG comparativ cu grupul martor.

Metode: Aprobarea etică pentru acest studiu a fost obținută la data de 30.12.2022 cu numărul E. Kurul-2022-20/32 fiind un studiu retrospectiv în perioada ianuarie 2021 – ianuarie 2023. 201 paciente de sex feminin care au fost diagnosticate cu FMS în Policlinica de Kinetoterapie și Reabilitare și cărora li s-a solicitat testarea ENMG cu un diagnostic preliminar de CTS au fost incluși în studiu ca grup de pacienți. 201 pacienți au fost incluși ca grup martor.

Rezultate: În timp ce numărul de pacienți cu CTS drept a fost de 39 (25,49%) în grupul FMS, numărul de pacienți cu CTS drept a fost de 38 (24,20%) în grupul martor. În timp ce numărul de pacienți cu CTS stânga a fost de 34 (25%) în grupul FMS, numărul de pacienți cu CTS stânga din grupul martor a fost de 36 (24,65%). Când am analizat un total de 592 de rezultate ENMG în studiul nostru, am găsit o rată normală ridicată a ENMG de 75%.

Concluzie: Am constatat că nu a existat nicio diferență între FMS și grupul martor în ceea ce privește compatibilitatea între diagnostiul anterior și diagnosticul electroneurofiziologic în rezultatele EMG solicitate cu diagnosticul CTS în studiul nostru. Examinarea EMG trebuie solicitată evaluând mai întâi bine pacientul pentru indicația corectă.

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Conflict of interest: All authors declare that there is no conflict of interest.

Ethical standards: All procedures performed in studies involving human were in accordance with the ethical standards of the institutional research committee (Acibadem Mehmet Ali Aydinlar University Medical Research Evaluation Committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was not obtained since the study was conducted with retrospective patient data.

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