ELECTROPHYSIOLOGICAL CORRELATION AND GRADATION OF PATIENTS PREDIAGNOSED WITH CARPAL TUNNEL SYNDROME

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ABSTRACT

Aims: In this study, it is aimed to detect electrophysiological correlation of patients who were referred to Trakya University Medical Research Center Neurology Clinics Electromyography (EMG) lab in 2014 with Carpal Tunnel Syndrome (CTS) pre-diagnosis and grade them based on electrophysiological features.

Methods: Electromyography (EMG) records of 174 patients who were sent to electromyography lab in 2014 with Carpal Tunnel Syndrome (CTS) pre diagnosis were scanned retrospectively. Patients were recorded with the data of gender and age. Correlation between pre diagnosis and electrophysiological diagnosis were reported statistically by using Kappa and McNemar tests. Patients were classified based on sex using Chi-square test. Number and percentages, arithmetic mean± standard deviation, median (minimum-maximum) were used as descriptive analysis.

Results: Out of all electrophysiological diagnosis, 62 patients (35.6%) were consistent with pre diagnosis when 112 (64.4%) were inconsistent. Out of patients who were diagnosed with Carpal Tunnel Syndrome (CTS) according to their electromyography (EMG) findings, 31 patients (48.4%) had mild syndrome.

Conclusion: A big inconsistency between pre diagnosis and electromyography (EMG) results was detected. It is important to make a more careful and detailed examination to fix this problem.

Keywords: Carpal tunnel syndrome, electromyography, correlation

INTRODUCTION

Carpal Tunnel Syndrome (CTS) is the most common entrapment neuropathy (1). Prevalence of the syndrome among women is 5.8% while it is 0.6% among men (2). It is seen frequently (especially among women) and occurs when the median nerve is stranded and compressed in the carpal tunnel. This compression causes edema, inflammation and fibrosis in the surrounding soft tissue by destroying blood nerve barrier. In the next level of the disease, destruction of myelin sheath around the median nerve followed by axon damage is seen. Patients usually complain about numbness, tingling and pain in first 3.5 fingers of palmar surface. In physical examination, hypoesthesia in nerve sensory areas, weakness and atrophy in thenar muscles may be detected.

Electromyography (EMG) is a diagnostic procedure based on detecting and recording the electrical potential generated by nerves and muscles (3). It is an important guide for many diseases that are associated with peripheral nervous system involvement – mainly CTS. This is why clinical examination followed by electrophysiological study is usually requested by physicians (4). EMG findings can also show the level of the disease (2).

Referring patients to EMG labs with a wrong pre-diagnosis is an important reason increasing the workload. In this study, it is aimed to detect electrophysiological correlation of patients who were sent to the Trakya University Medical Research Center Neurology Clinics Electromyography (EMG) lab with Carpal Tunnel Syndrome (CTS) pre diagnosis and grade them based on electrophysiological features by studying their EMG findings.

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MATERIAL AND METHODS

In this study, EMG data of all patients who have been referred to the Trakya University Medical Research Center Neurology Clinics Electromyography (EMG) lab in 2014 with CTS pre-diagnosis were scanned retrospectively. EMG data of 174 patients who were detected by searching lab appointment book and had been referred to EMG lab with CTS pre-diagnosis were available in archive room of the clinic. The reports that were obtained by using lab's Medelec Synergy EMG machine had sections on date, patient name, age, gender, EMG data and results. To protect privacy of the volunteers, names of the patients have not been recorded in any phase of the study. Patients were recorded only with the data of age and gender.

By evaluating the EMG data, it was examined if the patients were electrophysiologically diagnosed with CTS. The patients who were electrophysiologically diagnosed with CTS were classified in 5 groups as mild, mild-moderate, moderate, moderate-severe and severe.

EMG findings were evaluated to see whether the patients who were diagnosed with CTS had the correct clinical pre-diagnosis and grade the syndrome. For this process, Kappa and McNemar tests were applied by using SPSS. Distribution by gender of patients was evaluated with Chi-Square analysis by using SPSS. As descriptive analysis, numbers and percentages, arithmetic mean ± standard deviation, median (minimum-maximum) values were used, and (α=0.05) has been used as for two-way statistical analysis.

RESULTS

Out of 174 patients who took part in the study, 132 of them were female (75.9%) and 42 of them were male (24.1%). Average age of the patients was 46.43 ± 13.16 and the youngest one was 18 while the oldest one was 76.

All of the patients had clinical CTS pre-diagnosis but after electrophysiological study, only 62 of the patients (35.6%) had compatible diagnosis. No electrophysiological CTS findings were observed in 112 (64.4%) patients. Inconsistency between prediagnosis and EMG results were significant (p<0.05). Out of 62 patients who were diagnosed with CTS according to their EMG findings, 50 of them (80.6%) were female when 12 of them (19.4%) were male.

Out of patients who were diagnosed with CTS electrophysiologically, 31 (48.4%) had mild, (4.8%) had mild-moderate, 19 (30.6%) had moderate, 8 (12.9%) had moderate-severe and 1 (1.6%) had severe CTS. Correlation between syndrome's electrophysiological gradation and gender was statistically insignificant (p=0.363) (Figure1).
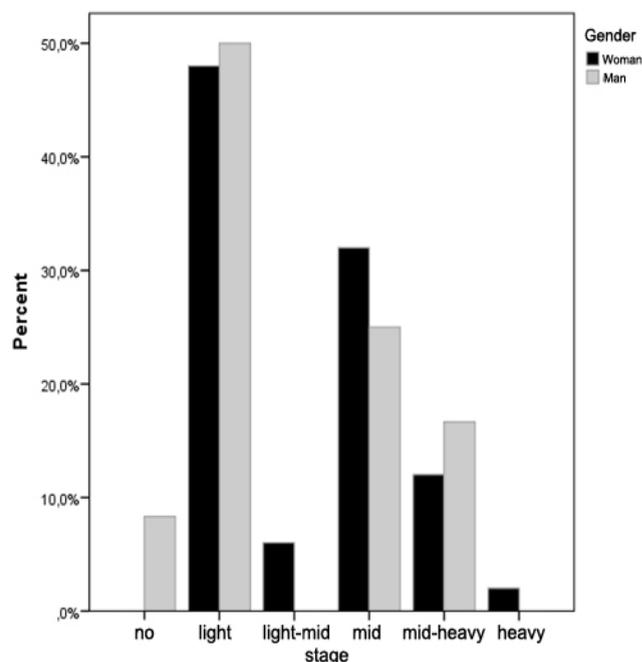

Figure 1: Electrophysiological Evaluation of Patients with CTS

Relation between syndrome's electrophysiological gradation and age was also searched but the result was statistically insignificant (p=0,730).

CONCLUSION

In this is study, it was determined that out of 174 patients who were referred to the Trakya University Medical Research Center Neurology Clinics Electromyography (EMG) lab in 2014 with CTS pre diagnosis only 62 of them (35.6%) were actually diagnosed with CTS according to their EMG data.

The results of the study on CTS carried out by Atroshi et al. (5) on 2466 people were consistent with our results. Even though clinical complain ratio was found to be 14.4% by Atroshi et al. , only 4.9% of cases had positive findings after nerve conduction studies. Similar to this, out of 570 patients with CTS pre diagnosis who were retrospectively researched by Okuyucu et al.

(4), 44% of them had compatible diagnosis according to their EMG datas. Also in a retrospective study carried out by Türkel et al. (3), out of 253 patients with CTS pre-diagnosis, only 50.6% had compatible diagnosis (3).

It is a fact that some other factors might have affected the large inconsistency between clinical pre diagnosis and the actual diagnosis according to EMG datas. On CTS diagnosis, median nerve conduction studies are thought to be gold standard in which sensitivity is greater than 85% and specificity than 95% (6). Especially for the patients with mild CTS, contribution of electrophysiological evaluation decreases due to low sensitivity and specificity (4). In this study, out of patients who were electrophysiologically diagnosed with CTS, 31 of them (48.4%) were found to have mild CTS. As most of the patients diagnosed with CTS had mild disease, it leads us to think that not having a correlation with clinical findings might be due to wrong EMG test results.

Examination procedures helps to diagnose and follow-up of diseases. Since the number of patients for a physician is too high, especially in our country, physicians are led to diagnose by examination procedures, instead of clinical findings. Increased legal responsibilities also play an active role in favor of examination procedures. EMG is highly preferred to diagnose frequent diseases like CTS (3).

Patients who are sent to EMG labs with a wrong pre diagnosis increase workload in laboratories. Increased workload for lab workers also extends the diagnosis process dramatically, and increases the cost for Social Security Institution (SGK). A detailed and careful physical examination is important before patients are sent for electrophysiological analyze with a correct pre-diagnosis. But it was seen that when referring patients to EMG labs, this is not considered much.

As a result, a large inconsistency between clinical pre diagnosis and electrophysiological diagnosis was detected. It is a sign that many patients are referred to EMG labs with a wrong pre diagnosis. More detailed and thorough clinical investigations will reduce the high workload in EMG laboratories, fasten the diagnostic procedure, and also reduce the workload of EMG lab workers, increasing their efficiency. It will also reduce Social Security Institution (SGK) costs.

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