The Frequency Of Carpal Tunnel Syndrome In Patients With Rheumatoid Arthritis

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Citation

M Aluclu, A Turhanoglu, M Aluclu. *The Frequency Of Carpal Tunnel Syndrome In Patients With Rheumatoid Arthritis*. The Internet Journal of Neurology. 2005 Volume 5 Number 2.

Abstract

Objective: Rheumatoid Arthritis (RA) may be associated with vasculopathy, peripheral, autonomic and entrapment neuropathy. In this study, carpal tunnel syndrome (CTS) in patients with RA was investigated.

Subjects And Method: 40 adult patients (totally eighty hands) with RA according to the revised criteria of American College of Rheumatology and 20 healthy volunteers (totally forty hands) for control group were included into the study. Nerve conduction velocity was performed to the both groups.

Results: Carpal tunnel syndrome (usually in sensorimotor axonopathy form) was determined in 20 hands (25%) of the patients with RA but it was not found in the control group. The three hands had minimal CTS (3.75%), five hands had mild CTS (6.25%), five hands had moderate CTS (6.25%) and the rest had severe CTS (8.75%), ($p<0.005$).

Conclusions: In this study, the prevalence of CTS in patients with RA may be high. We consider that treatment of CTS by medical and/or surgery methods in RA patients will decrease complaints and increase life quality. Therefore, we recommend that an electroneurophysiologic examination should be performed in all patients with RA as routine diagnostic procedure.

INTRODUCTION

Rheumatoid Arthritis (RA) is a systemic inflammatory disease of unknown etiology characterized by the manner in which it involves the joints. RA is also associated with vasculopathy, peripheral, autonomic and entrapment neuropathy resulting in distal sensory, combined sensory and sensorimotor neuropathy ([1], [2], [3], [4]). Carpal tunnel syndrome (CTS) is the most common form of entrapment neuropathies, and is the prototypical injury of the median nerve at the wrist is either an acute or chronic compressive lesion. It is usually diagnosed by the electrodiagnostic studies and clinical findings are variable and include symptoms of burning pain, tingling, numbness, and weakness or atrophy in the hands of the patients ([5]). Tenosynovial proliferation of the flexor tendons which increases pressure in the carpal tunnel causes to CTS in patients with RA ([4]). It is often difficult to diagnose early stage of CTS in the examination of the peripheral neuromuscular system due to similar symptoms resulting from pain in the joints, and limitations of movement ([6]). However, electrodiagnostic studies clearly show the existence of subclinical neuropathies ([7]).

The aim of this study is to indicate the importance of CTS in RA patients and to determine frequency of it by means of electrodiagnostic studies. It is well-known that CTS could be treated by medical and/or surgery methods. Therefore, complaints from CTS will decrease and life quality of patients with RA will increase.

SUBJECTS AND METHODS

SUBJECTS

This study was carried out in the Departments of Neurology and Physical Medicine-Rehabilitation at University of Dicle in Diyarbakir, between March 2002 and January 2003. Eighty hands of 40 adult patients with RA (34 female, 6 male, aged 20-70 year, mean 45.9±10.90 yr) were included into the study. Forty hands of 20 healthy volunteers (12 female, 8 male, aged 30-65 mean 43.8 ±5.66 yr) who had normal neurological examination were accepted as control

group. RA was defined according to revised criteria of the American College of Rheumatology ([8]). The mean duration of RA in these patients was 5.6 years (± 5.8 month). The preliminary criteria for clinical remission in RA were used to evaluate the remission of the patients and the results showed five of them were in the remission ([9]). The general activities of the other patients with RA were relatively well controlled by the oral administration of non-steroidal anti-inflammatory drugs, disease modifying anti-rheumatoid drugs, or corticosteroids. Patients with diabetes mellitus (fasting serum glucose level ≥ 126 mg/dL), hepatic, renal disorders, cervical neuropathy, chronic abuse of drugs and other peripheral neuropathies were excluded.

METHODS

NERVE CONDUCTION STUDIES

The electrodiagnosis protocol recommended by American Association of Electrodiagnostic Medicine (AAEM) was used ([10]). Neurophysiological studies were performed by Nihon Kohden MEB 9102K EMG machine, two channel electrophysiological measurement device. The nerve conduction studies included the sensory and motor conduction velocities of median and ulnar nerves in the upper limbs were recorded. In addition, comparative test were performed in the fourth digit for ulnar-median nerve stimulation in wrist. The temperature of the room was maintained at 22-24°C during all the processes. Standardized nerve conduction velocity techniques were used. Nerve conduction velocities were measured with conventional methods by using surface electrodes. For motor nerve conduction studies active surface electrode was placed on the motor point of the appropriate muscle and reference 3cm apart. Median and ulnar nerve compound muscle action potentials (CMAPs) were recorded from the abductor pollicis brevis and the abductor digiti minimi muscles and stimulation was delivered at the wrist, and at the elbow. Sensorial nerve conduction studies were performed antidromically and minimum 10 responses were averaged. Ring electrodes were placed on the second digit for median nerve and on the fifth digit for ulnar nerve. In addition, the comparative test was performed in the fourth digit for ulnar-median nerve stimulation in wrist. Latencies were measured at the initial deflection of the action potential in motor and at the peak of the negative spike in sensor studies. Amplitudes represent the distance between isoelectric trace and negative peak in sensory and peak-to-peak in motor conduction studies ([11]).

DESCRIPTION OF DIAGNOSTIC CRITERIA FOR CTS

The diagnostic criteria for CTS includes a distal motor latency more than 4.3 ms for median motor nerve; motor or sensory nerve conduction velocity less than 45m/s and of more than 0.5 ms latency difference in comparative test ([4], [12], [13]).

The severity of CTS was assessed through the previously reported neurophysiological classification ([14]); 1-Extreme (absence of motor and sensory responses); 2-Severe (absence of sensory response and abnormal distal motor latency); 3-Moderate (abnormal digit-wrist sensory nerve conduction velocity and abnormal distal motor latency); 4-Mild (abnormal digit-wrist sensory nerve conduction velocity and normal distal motor latency); 5-Minimal (abnormal comparative tests only); and 6-Negative (normal findings in all tests).

STATISTICAL ANALYSIS

All results were presented as mean ± standard deviation (SD). The student-t test and chi-square were used for the statistical analyses. The level of significance was set at p-value of 0.005.

RESULTS

There was no significant difference between the ages of the RA patients (mean 45.9±10.90 yr) and control groups (mean 43.8 ±5.66 yr) ($p<0.005$). The mean disease duration was 5.6 ± 5.8 years. Symptoms and findings of the peripheral neuropathy were not detected in any patients on neurological examination.

The results of the electrophysiological studies are given in Table-l. Fourteen patients had unilateral CTS, and three patients' were bilateral CTS, totally twenty hands in RA group. Three patients were found to show minimal CTS (3.75%), five patients' mild (6.25%), five patients moderate (6.25%), and seven patients severe (8.75%). CTS were determined mostly as a sensorimotor axonopathy in 25% of the patients with RA. Normal neurological examination and nerve conduction studies on 20 healthy volunteers of control group assessed that there were no any CTS in this group.

Figure 1

Table 1: Carpal tunnel syndrome prevalence in patients with Rheumatoid Arthritis and control groups.

	Number of hands with RA patients (n=80)	Control group (n=40)
With CTS	17 (42.5 %)*	0
Minimal	3 (3.75 %)	
Mild	5 (6.25 %)	
Moderate	5 (6.25 %)	
Severe	7 (8.75 %)	
Without CTS Negative	60(57.5 %)*	40 (100%)

- p< 0.005 significantly difference compared as control group.

DISCUSSION

In adults the rare concurrence of CTS in patients with RA has been investigated in the literature. CTS frequency reported of between 3.6-6% in RA patients ([2, 4, 6, 7, 15]). In this study, the prevalence of CTS in patients with RA was significantly high (25%). This high CTS rate can be attributed to the fact that 87.5% of the patients were at the active period. In case of the presence of clinical systemic vasculitis, vasculitis neuropathy develops in large proportion of the patients ([16]). Peripheral neuropathy occurs mostly as a sensorimotor axonopathy in approximately 1-18 % of patients with RA ([1, 2]). The pathogenesis of peripheral neuropathy is likely to involve several mechanisms such as compressive neuropathy, tenosynovitis and humoral mechanisms. Compressive neuropathy, involved in RA, is by far the commonest or vasculopathy resulting in distal sensory and combined sensory and sensorimotor neuropathy ([1]). In some of the original descriptions of CTS, tenosynovitis was frequently implicated as a major causative factor for CTS. Inflammation in the synovium of the flexor tendons can cause increased pressure in the carpal tunnel and contribute to median nerve compression ([13]). Recently, humoral mechanisms have developed in patients with RA, in such ways of the deposition of immune complexes, and fixation of complement which are important factors, but this theory has not been supported adequately ([17, 18]). However, we found CTS in combined sensory and sensorimotor neuropathy as results of compressive neuropathy in patients with RA.

The patients with CTS usually complain of numbness, paresthesias, and pain in the median nerve distribution. These symptoms are similar to that of RA patients and probably were masked. Clinical evaluation of RA patients in the search for neuropathy is difficult since neuropathic symptoms are confused with arthritis ([19]). Various physical maneuvers designed to stress the median nerve in the carpal tunnel (e.g., phalen's test, reverse phalen test) may exacerbate the symptoms. These tests are especially discriminatory values in the majority of patients with CTS ([20]). But, hand-wrist impediments of all RA patients did not allow us to apply these tests in the study. Therefore, the diagnosis of CTS in RA patients is difficult because of such clinical findings. Disease parameters of RA such as activity, rheumatoid factor and functional and radiological grade do not correlate with neuropathy and CTS ([21]). EMG studies are gold standard due to providing objective signs of neuropathy for the differential diagnosis of CTS ([4]). Because CTS could be treated by, means of medical and/or surgery methods.

CONCLUSION

Prevalence of CTS in patients with RA may be high. We consider that treatment of CTS by medical and/or surgery methods in RA patients will decrease complaints and increase life quality. Therefore, we recommend that an electroneurophysiologic examination should be performed in all patients with RA as routine diagnostic procedure.

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