SUMMARY

ELECTROPHYSIOLOGICAL FINDINGS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE; NERVE TRANSMISSION EVALUATION, MUP ANALYSIS, INTERFERANCE PATTERN ANALYSIS, MACRO EMG, MOTOR UNIT NUMBER ESTIMATION

Chronic obstructive pulmonary disease (COPD) is an inflammatory process with limitation of the airflow in the lung. COPD is a chronic and progressive process that leads to tissue hypoxemia and thereby affects lung and the whole body. There are some studies reporting the damage of peripheral nerves and muscles in this process. But, the number of these reports and also the sensitivity of these methods for the demonstrating of damage were limited.

In this study, some electrophysiological methods which investigate nerve and muscle functions (nerve conduction study, motor unit potential analysis, interference pattern analysis, macro electromyography and motor unit number estimation) were used to find any similarities and differences between in patients who diagnosed as COPD and in normal individuals.

This study was performed in Adnan Menderes University Medical Faculty at the departments of Neurology and Chest Diseases. 32 COPD patients and 28 voluntary healthy individual (totally 60 patients) were involved in the study. All of them were male and were in similar ages (COPD 63,09±7,65; normal 61,50±7,27).

In nerve conduction study, ulnar sensory latency and velocity, sural sensory duration and latency, and ulnar motor distal latency values were different in the COPD group than the normal. (Latency and duration were long, and velocity was decreased). While abnormality rate was not different statistically between in these groups (COPD 40,6 %; normal 21,4 %), the COPD group revealed high abnormality ratio (1,89) than the normal. Nerve damage might be isolated sensory, isolated motor or both nerves, and nerve damage was not related with patients' age and COPD severity. In motor unit potential analysis, phase and turn values of motor unit potential were increased while duration, area, area/amplitude ratio, and size index values of motor unit potential were decreased in COPD group compared to normal. In interference pattern analysis turn, activity and number of short segment values of motor unit potential were increased, but amplitude value was decreased in COPD group compared to normal. In motor unit number estimation test, while the thenar and hypothenar region MUNE

values were not different in these two groups, better motor unit number count was detected on the tibialis anterior muscle in COPD group than normal. In macro EMG analysis, results found similar in both COPD and normal group.

All types of nerve damage can be seen in COPD cases. We did not observed statistically significant difference between COPD group and normal, but there was a high abnormality ratio in COPD group. Findings gathered from MUP analysis and interference pattern analysis were similar to findings that observed when there were muscle fiber loss and muscle fiber diameter changes. These electrophysiological findings may reflect the pathological changes of muscle fibers that loss of type I muscle fibers and increased of type II muscle fibers in COPD patients. In macro EMG analysis, because of absence of statistically significant difference between groups suggested that motor unit area did not increase in COPD patients. Better fibular MUNE values observed in motor unit number estimation method couldn't be explained. According to principal component analysis and discriminant analysis, all performed electrophysiological investigations classified groups accurately at a rate of 68,3 %. The most distinguishing parameters were the results of ulnar sensory nerve conduction velocity and the results of interference pattern analysis of biceps brachii muscle.

Key words: COPD, nerve conduction study, motor unite potential analysis, interference pattern analysis, IPA, macro EMG, axon counting, MUNE, basic components analysis, detachment analysis.