

Long-standing research, that are taking into consideration cancer issues, have an effect on increasing in survival. Lung cancer has long been the most common malignant neoplasm in the world with the highest cancer mortality for both genders.

In the project we plan to study the possibilities of using the forced oscillation technique (FOT) in patients with non-small cell lung cancer after thoracic surgery subjected to an early pulmonary rehabilitation. The advantage of FOT over conventional lung function techniques has already been proven for children and the elderly. The implementation of this innovative technique, as a potential standard in patients with lung cancer after thoracic operation, could supply objective and reliable measurements of lung functions and permit to select personalized rehabilitation program and then to evaluate its effects. Simultaneously, we plan to perform a comparative analysis with spirometry results to determine which of these available methods is more accurate to reflect lung functions in this group of patients. Moreover, we will carry out an analysis of the influence of pulmonary rehabilitation in patients with non-small cell lung cancer after thoracic operation on the quality of life, respiratory muscles strength as well as a comparative analysis of the resistance in distal airways in results of the forced oscillation technique and plethysmograph.

The project will be carried out in a group of 120 patients of both genders with an early diagnosis of non-small cell lung cancer (in the last 6 weeks), after operative treatment (14 ± 7 days- lobectomy, pneumonectomy, VATS), histologically or cytologically confirmed. During the hospitalization all the patients will undergo a two-week-long pulmonary rehabilitation program under a physical therapist supervision. The intensity of the training will determine the limit of heart rate obtained during 6 minutes walking test. In patients who will be qualified to the research and will give their informed consent in writing, at the moment of admittance to the hospital will be performed exercise tests, lung function tests, among them an innovative measurement with the forced oscillation technique and the quality of life and dyspnea questionnaires will be conducted. After two-week-long rehabilitation program is completed, all the patients will again be evaluated with the tests and the questionnaires used before the rehabilitation. Afterwards all the results obtained before and after the rehabilitation program will be compared.

The study that we propose is taking into consideration a basic field of research, as an analysis of influence of physical activity on human health. It assumes an innovative measurement of lung functions based on forced oscillation technique. Until now FOT have been studied and dedicated only to children and the elderly. With the current knowledge patients who suffer from lung cancer and were subjected to thoracic operation, manifest obturative disorders. In consequence, a model of rehabilitation used in this group of patients corresponds to the rehabilitation program applied in patients with chronic obstructive pulmonary disease. The important fact is that in some patients with cancer and/or after operation, we observe an atelectasis and fibrosis with a prevalence of restrictive disorders. As a result, a completely different bedside manner should be applied, i.e. one with a scheme of the rehabilitation that brings greater benefits and advantages. Additionally this technique significantly reduces the inconveniences connected with the pain issue that may accompany a conventional spirometry in patients after a recent operation, that may have an impact on test results.

This is pioneering research because, according to our knowledge, there are no literature position, neither about using the forced oscillation technique in patients with non-small cell lung cancer after thoracic surgery, nor about the influence of physical activity on the healing process in this group of patients. At the same time we plan to carry out a comparative analysis of the results obtained with the forced oscillation technique and the results of spirometry and plethysmograph with the purpose of determining which of these tests will prove to be the most accurate one to estimate lung functions.

A possible result of our study will be a completely new qualification method of personalised rehabilitation program based on lung function test measured with the forced oscillation technique.