

## SUMMARY

The aim of the planned study is to evaluate the effect of two different rehabilitation treatments on physiological, hematological and biochemical diagnostic indices - in particular those related to the immune system status and the quality of life of patients who completed the clinical sepsis therapy.

The study will be conducted with 60 patients with a history of hospitalizations for sepsis. They will be randomly assigned to three groups: control group - with no rehabilitation (which reflects the present medical treatment practice), and two experimental groups of patients participating in 3-month diagnostically monitored rehabilitation programs - either as the aerobic training on cycloergometer in a reclining position or in the form of the hyperbaric oxygen therapy.

Physiological, hematological and biochemical parameters which indicate the state and function of the immune system, oxidative stress level and degree of post-sepsis organ damage/recovery will be assessed in each patient after completion of clinical therapy of sepsis and in the following three months.

In all of the patients respiratory function tests (spirometry) and regular ECG cycloergometer exercise testing will be carried out in order to assess their physical capacity and/or the results of rehabilitation.

In addition, when leaving hospital and after 3 months, each patient will be surveyed with a quality of life questionnaire SF-36 (Short Form Health Survey) to assess eight subjective indicators of his/her life quality.

The project addresses the issue of sepsis - so important from both a social and medical point of view. Every year more than 30 million people worldwide are affected by this disease, and its incidence increases dramatically.

According to the latest reports, sepsis is a systemic immune reaction, which arises from the inability to repair local damage and leads to profound disability of signaling systems and, in extreme cases, to mute the body's immune response.

In spite of the enormous achievements of modern medicine neither the specific diagnostic methods, nor the standards for rehabilitation of the patients have been introduced yet. As a result, frequent hospital readmissions and a profound reduction in the quality of life occur in sepsis survivors. A high mortality rate amounting to 58% within 3.5 years and 61% within 5 years after clinical therapy are also noticed.

Moreover, the successful stabilization of the patient's condition and termination of hospital therapy does not guarantee full recovery. It has been observed that the Intensive Care Unit patients often experience long-lasting changes in the physical, mental and cognitive sphere. These impairments may persist for many years after hospital treatment.

Properly arranged physical exercise also contributes to the reduction of inflammation as well as the extent of organ damage caused by septic shock, and improve the quality of life of sepsis survivors.

In the course of septic process the oxygen consumption at the cellular level is severely impaired.

Therefore, our proposal is to start the research on the effects of hyperbaric oxygen therapy applied as the innovative form of rehabilitation on the health status of post-sepsis patients. Providing oxygen to damaged tissues improves their healing and renders them more resistant to infection.

The proposed project is the original experimental study. No trials of similar design have been reported so far in the scientific literature. However, the significance of rehabilitation for post-sepsis patients as the key to their recovery is strongly expressed as well as the need of new research to elucidate long-term functional impairments is highly encouraged.

The results of this study will be probably the first-of-its kind in science.

A comparison of two distinct forms of intervention used as rehabilitation treatments will allow for better understanding of the changes in patients' organisms during recovery after sepsis.

The new knowledge gained will constitute the starting point for the next stage - the applied research aimed at selection of the most effective rehabilitation methods. They prepare the ground for the future implementation of the appropriate procedures into the medical practice that will bring the diverse economic and social benefits.