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***Ocena skuteczności autorskiego programu ćwiczeń leczniczych
w rehabilitacji pacjentów po transplantacji wątroby***

***Evaluation of the effectiveness of the author's therapeutic exercise program in
the rehabilitation of patients after liver transplantation***

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SUMMARY

Introduction. Liver transplantation (LT) is an established method of surgical treatment of many liver diseases leading to acute or chronic liver failure. Significant progress in the field of surgical techniques and immunosuppressive treatment regimens has resulted in improved transplantation results, expressed in longer survival of recipients. With the growing number of patients after LT, there is an increasing need to update treatment standards related to the multimorbidity of recipients and the consequences of long-term use of immunosuppressive drugs. Chronic fatigue, osteoporosis and sarcopenia are the main reasons for limiting physical and occupational activity and lowering the quality of life after LT. A natural consequence is also the need to develop physiotherapeutic standards in the distant period after LT.

Objectives. The main aim of the study was to evaluate the effectiveness of the therapeutic exercise program in a group of patients after liver transplantation in the distant postoperative period.

Specific objectives:

- Assessment of the level of physical activity in a group of patients after liver transplantation participating in a research project.
- Evaluation of the effectiveness of verbal recommendations in terms of daily activity in the group of liver recipients.
- Evaluation of the impact of 12-week program of general fitness exercises on the level of physical activity and general fitness of patients after LT.
- Evaluation of the impact of 12-week program of general fitness exercises with the use of balance exercises, on the level of risk of falls in a group of patients with an increased risk of low-energy fractures in the distant period after LT.
- Evaluation of the impact of systematically performed general exercises on mental and physical well-being in a group of patients after LT.

Study groups and methodology.

Initially, 80 patients after liver transplantation were qualified for the study, with the basic inclusion criterion being a minimum of 3 months after LT surgery. Exactly half of them declared participation in the observation, constituting the study group, aged 18 - 73 years and an average age of 46.5 years. Finally, the study in this group was completed by 34 people,

including 18 women and 16 men. LT was caused by cholestatic diseases (Primary sclerosing cholangitis - PSC; Primary biliary cirrhosis - PBC) in 11 patients in the study group, and other liver diseases and disorders in 23 patients. Half of the patients in the study group had bone mineralization disorders, of which 5 patients were diagnosed with osteoporosis. The control group consisted of 40 patients after LT, including 21 women and 19 men with an average age of 46.5 years, who were offered to participate in a program of systematic therapeutic exercises, but refused to participate in it for various reasons. The cause of LT in 11 patients, in this group were also cholestatic diseases, and in the remaining 29 other diseases of the liver. Bone mineralization disorders were observed in 15 patients, of whom 5 were diagnosed with osteoporosis.

The study group participated in an organized form of therapeutic exercises at the Rehabilitation Department of the CSK UCK WUM. Classes were held twice a week. The observation period was 3 months. For the first 30 days of participation in the program, patients were instructed to take 8000 to 10000 steps a day. Rehabilitation classes were held in groups of ten. The exercises were general fitness, including balance exercises and elements of games and plays (so-called MULTIPRO). Exercise time was 60 minutes. Both groups (study and control) were tested twice (on the day of starting the program and after 3 months):

1. A survey using the International Physical Activity Questionnaire (IPAQ) and the Visual Analogue Scale (VAS), to assess physical and mental well-being.
2. 6 Minute Walk Test (6 MWT).
3. Functional Strength Test (FS).
4. Functional tests assessing the risk of falls: sharpened Romberg Test, Tinetti Test, Berg Balance Scale, 30 m forward and backward walking test, One leg standing test.

Results. In the study group, a symptomatic increase in general fitness and physical activity was found, expressed in a statistically significant improvement in the results of the following tests: 6MWT, FS Test and IPAQ. A positive effect of exercise was also shown in terms of reducing balance disorders and the risk of falls (functional test changes: OLS, Tinetti test, Berg balance scale, 30-metre forward and backward gait test) in the study group. In the subjective assessment using the analog VAS scale, patients from the study group declared a considerable improvement in both physical and mental well-being, compared to those from the control group.

Conclusions.

1. Liver transplant patients included in the study were characterized by at least a sufficient level of physical activity.
2. A verbal prescription for walking 8000 steps a day has been shown to be effective.
3. The developed 12-week program of general fitness exercises improved the level of physical activity and general fitness in the group of patients participating in the project.
4. The developed 12-week program of general fitness exercises improved the equivalent parameters and reduced the risk of falls. The Berg scale, the sharpened Romberg test and the Tinetti test were characterized by low ability to correctly identify the risk of falls in this group of patients.
5. The presented program of general rehabilitation significantly improved the physical and mental well-being in the group of examined patients after a liver transplant.

The value of physical activity in the lives of liver recipients is indisputable. The proposed form of general rehabilitation exercises encourages the continuation of research in the field of developing precise guidelines for the use of exercises after liver transplantation. Balance training may be an important element in the prevention of pathological fractures in recipients suffering from osteoporosis or osteopenia. In addition, medical training may reduce the fatigue in this group of patients. Consideration should be given to increasing the availability of organized physiotherapy classes with the use of telerehabilitation.

Key words: Physical activity, liver transplantation, osteoporosis, risk of falls, balance training