ТЕРАПІЯ ТА РЕАБІЛІТАЦІЯ

DYNAMICS OF THE LEVEL OF FUNCTIONING OF MIDDLE-AGED PATIENTS AFTER LAPAROSCOPIC CHOLECYSTECTOMY IN THE POST-ACUTE REHABILITATION PERIOD

ДИНАМІКА РІВНЯ ФУНКЦІОНУВАННЯ ПАЦІЄНТІВ СЕРЕДНЬОГО ВІКУ ПІСЛЯ ЛАПАРОСКОПІЧНОЇ ХОЛЕЦИСТЕКТОМІЇ У ПІСЛЯГОСТРОМУ ПЕРІОДІ РЕАБІЛІТАЦІЇ

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Abstracts

Aim is to determine the dynamics of the level of functioning of activity and participation of middle-aged patients with acute calculous cholecystitis (ACC) and chronic calculous cholecystitis (CCC) after laparoscopic cholecystectomy (LCC) in the post-acute rehabilitation period and the effectiveness of the developed individual rehabilitation programs. **Methods.** Middle-aged patients aged 45 to 59 years with CCC (n=40) and patients with ACC (n=40) who underwent laparoscopic cholecystectomy in the surgical department of the Ivano-Frankivsk Central City Clinical Hospital (IFCCH) in 2019–2020 were included. They were assessed for functional impairment, activity, and participation using the International Classification of Functioning (ICF). The study was simple, randomised, with blinded assessors during the interview, examination and data processing. Exclusion criteria: the presence of neuropsychiatric pathology in patients; refusal of patients to participate in the study. There were no dropouts from the study. Statistical methods included measurement of the median value (Me), upper and lower quartiles (25%; 75%). The Mann-Whitney U-test was used to compare independent samples, and the Wilcoxon T-test was used for dependent samples, differences at $p<0,05$ were considered statistically significant. **Results.** In patients of MG1 and MG2, a statistically significant difference was found in the level of dysfunctions and limitations in sleep function, emotional function, pain, respiratory function, fatigue, bowel function, trunk muscle strength, washing of body parts, control over diet and physical fitness in comparison with before and after rehabilitation, which indicates the effectiveness of the implemented individual rehabilitation programs in the subacute stage of rehabilitation. **Conclusions.** In the post-acute period of rehabilitation under the influence of individual rehabilitation programs for middle-aged patients after LCC aimed at solving specific short-term and long-term goals aimed at activity and participation lasting 21 days can positively affect the reduction of dysfunctions and limitations in such indicators as: sleep function, emotions, respiratory function, fatigue, defecation function, washing of body parts, control over diet and physical fitness. For patients after LCC with decreased trunk muscle strength, exercise tolerance, digestive function, muscle endurance, and long-distance walking, it is necessary to continue rehabilitation interventions for long-term rehabilitation periods.

Key words: rehabilitation, physical therapy, quality of life, ICF, cholecystectomy.

Мета – визначити динаміку рівня функціонування діяльності та участі пацієнтів середнього віку із гострим калькульозним холециститом (ГКХ) та хронічним калькульозним холециститом (ХКХ) після лапароскопічної холецистектомії (ЛХЦ) у післягострому періоді реабілітації та ефективність розроблених індивідуальних реабілітаційних програм. **Матеріал.** Включено пацієнтів середнього віку від 45 до 59 років із ХКХ (n=40) та пацієнтів із ГКХ (n=40), яким була проведена лапароскопічна холецистектомія у хірургічному відділенні Івано-Франківської центральної міської клінічної лікарні (ІФЦМЛ) у 2019–2020 роках. Здійснювали оцінку щодо наявності порушень функціонування, активності та участі із використанням міжнародної класифікації функціонування (МКФ). Дослідження просте, рандомізоване, із засліпленням оцінювачів під час опитування, обстеження та обробки отриманих даних. Критерії виключення: наявність у пацієнтів нейропсихічної патології; відмова пацієнтів від участі в дослідженні. Вибування із дослідження не було. Статистичні методи включали вимірювання медіанного значення (Me), верхнього та нижнього квартилів (25%; 75%). Для незалежних вибірок використовували U-критерій Манна-Уітні, залежних – Т-критерій Вілкоксона, статистично значущими вважали розходження при $p<0,05$. **Результати.** У пацієнтів MG1 і MG2 у порівнянні до і після реабілітації виявлено статистично значущу різницю зниження рівня дисфункцій та обмежень у функції сну, функції емоцій, відчуття болю, функції дихання, втоми, функції дефекації, сили м'язів тулуба, миття частин тіла, контроль над раціоном і фізичною формою, що свідчить про ефективність впроваджених індивідуальних програм реабілітації на підгострому етапі реабілітації. **Висновки.** У післягострому періоді реабілітації індивідуальні програми реабілітації для пацієнтів після ЛХЦ середнього віку, спрямовані на вирішення конкретних короткострокових та довгострокових цілей, спрямовані на діяльність та участь тривалістю 21 день, здатні позитивно вплинути на зниження рівня дисфункцій та обмежень у таких показниках, як: функції сну, емоції, функції дихання, втома, функції дефекації, миття частин тіла, контроль над раціоном і фізичною формою. Для пацієнтів після ЛХЦ зі зниженими функціями сили м'язів тулуба, толерантності до фізичного навантаження, функцій травлення, функцій м'язової витривалості, ходьби на великі відстані необхідно продовжити реабілітаційні втручання на довготривалих періодах реабілітації.

Ключові слова: реабілітація, фізична терапія, якість життя, МКФ, холецистектомія.

Introduction. Diseases of the gallbladder and biliary tract are widespread, especially among people of working age. Gallstone disease (GD) is a multi-etiological disease of the hepatobiliary system with predominant formation of gallstones. In economically developed countries, the incidence of gallstones reaches 10–15% of the adult population. In women, this disease occurs 3–4 times more often than in men. Laparoscopic cholecystectomy (LCC) is the main treatment for acute cholecystitis. Although it is considered relatively safe, the risk of serious complications is 6%–9%, and the risk of mortality is 0.1%–1%. [8]. LCC can be safely offered to even elderly patients, despite a longer postoperative hospital stay [11 16].

Today, LCC is the gold standard for the treatment of patients with calculous cholecystitis. Compared to open cholecystectomy, patients recover faster, especially middle-aged and young people, as opposed to the elderly, due to the high risk of surgical and postoperative complications [8; 11; 16].

Many scientific studies have shown that LCC improves the quality of life and condition of patients with calculous cholecystitis. A separate topic is also research on the effectiveness and improvement of surgical treatment tactics. Numerous scientific studies also indicate that there is a percentage of patients after LCC who have the so-called post-cholecystectomy syndrome and need rehabilitation intervention not only in the acute, subacute, but also in the long term. Although this percentage of complications is small, taking into account the large number of cholecystectomies performed annually in Ukraine and the world, it becomes clear that this issue remains relevant for many patients. The reasons for this can be quite different – from complications of surgery to the presence of concomitant pathology of the abdominal cavity or related diseases. Most studies are devoted to the effectiveness of drug treatment of postcholecystectomy syndrome [8; 11; 16; 17]. Such patients need measures to reduce postoperative anxiety, which should be adapted to individual needs [17].

Our research, using the International Classification of Functioning, Disability and Health (ICF), has established that patient with

postcholecystectomy syndrome, in addition to impaired biliary, gastrointestinal and other systems, also have impaired tone of the trunk and abdominal muscles, decreased aerobic capacity, muscle strength and overall endurance, and some difficulties in certain activities and participation [15]. Medication, although effective, cannot solve all problems of functioning, activity and participation and requires a broader view of interventions using physical therapy and occupational therapy to restore or improve the dysfunctions identified during the examination [6; 15]. The presence of a reduced level of functioning, activity, and participation requires the development and implementation of individualized rehabilitation plans for each patient after LCC. To date, the best tool for ensuring a patient-centered approach to rehabilitation is the ICF, as the ICF assesses such categories as body functions, body structures, activities and participation, as well as environmental factors [2; 6; 7; 9; 10]. The ICF is a good tool for developing individual rehabilitation programs (plans), setting rehabilitation goals, and evaluating their effectiveness using a biopsychosocial approach [2; 10; 14]. The aim and objectives of the study are to determine the dynamics of the level of functioning activity and participation of middle-aged patients after laparoscopic cholecystectomy in the post-acute rehabilitation period, to determine the effectiveness of the developed individual rehabilitation programs at the subacute (outpatient) stage of rehabilitation using a biopsychosocial approach for patients after LCC and their impact on the level of functioning, activity and participation.

Methods. The study included middle-aged patients aged 45 to 59 years with CCC (n=40) and patients with ACC (n=40) who underwent laparoscopic cholecystectomy in the surgical department of the Ivano-Frankivsk Central City Clinical Hospital (IFCCH) in 2019–2020. Upon admission to the surgical department, patients with CCC were divided into a basic group (BG1) and a main group (MG1) by randomization using a simple random selection method with a draw, and those with ACC were divided into a basic group (BG2) and a main group (MG2). The structure of the groups is shown in more detail in Table 1. After obtaining informed written consent, patients of BG1 and BG2 agreed to undergo all examinations, and patients of MG1 and MG2 continued to receive rehabilitation according to our methodology using a biopsychosocial approach in the post-acute period. Exclusion criteria: the presence of neuropsychiatric pathology in patients; refusal of patients to participate in the study. There were no dropouts from the study. Assessors were blinded to the survey, examination, and data processing. Based on objective examinations, the presence of impairments in functioning, activity and participation was assessed using the ICF (according to the World Health Organization version of 2001) [1]. The computer program "Functional profile of the patient after cholecystectomy (PROFCHOL)" was used to enter data on the level of functioning of patients after cholecystectomy according to the ICF. Statistical analysis. The results were processed by means of mathematical statistics using the IBM SPSS Statistics 23 program. The calculations included the measurement of the median value (Me), upper and lower quartiles (25%; 75%). The Mann-Whitney U-test was used to compare independent samples, and the Wilcoxon T-test was used for dependent samples, differences at $p<0.05$ were considered statistically significant.

The methods used in the study were approved by the Ethics Committee of Ivano-Frankivsk National Medical University (IFNMU) when planning a comprehensive research work, approved by the decision of the Academic Council of IFNMU, protocol No. 19 of 20.12.2018. on the topic: "Development and improvement of organizational and methodological bases of physical therapy in patients with diseases of the abdominal cavity and nervous system" (state registration number 0119U000448) and scientific research of IFNMU in the field of health care in the specialty 227 "Physical therapy, occupational therapy" on the topic: "Theoretical and methodological bases of physical therapy of patients after laparoscopic cholecystectomy" (state registration number 01119 U 2951).

Results of the study.

Demographic data of patients are presented below (Table 1).

ICF scoring criteria: when there were no or minor disorders, patients received 0 points; 1 point when there were mild, minor disorders; 2 points moderate, significant disorders; 3 points – severe, significant, intense disorders; 4 points – absolute, total disorders.

The PROFCHOL computer program was used to create a "Patient Functional Profile", which included the existing disorders of the body's function (b), activity and participation (d) at the time of the initial interview/examination of the patient, and which were present at the time of discharge. The use of the computer program facilitated the work of the multidisciplinary team of the rehabilitation department in assessing the level of functioning and activity of the patient, setting rehabilitation goals and determining the scope of rehabilitation services in the development and implementation of individual rehabilitation programs; reduced the time spent on examination and coding according to the ICF and determining the effectiveness of the rehabilitation intervention for patients after LCC. It should be noted that all disorders of body functions that were included in the "Functional Profile of the Patient" were confirmed by standardized assessment tools, such as spirometry, the Berg Balance Scale, the 6 Minute Walk Test, the Borg Rating of Perceived Exertion, the Spielberger State-Trait Anxiety Inventory, hand dynamometry and others, depending on the type of dysfunction. In order to achieve the goals of functioning, activity and participation, individual rehabilitation programs were developed and appropriate physical therapy and, if necessary, occupational therapy were selected.

Patients of all groups were followed up by a gastroenterologist for the surgical intervention, and if necessary, they received dietary and medication support as indicated. In case of concomitant diseases, they received consultations and follow-up from other specialists. All patients were familiarized with recommendations on the specifics of nutrition after surgery. The methodology of rehabilitation of patients in MG1 and MG2 was based on the assessment of patient functioning using the ICF. The process was problem-oriented and aimed at achieving long-term and short-term rehabilitation goals. A patient-centered approach was used, which involved planning and conducting rehabilitation taking into account the needs, capabilities and wishes of the person receiving rehabilitation care. Since the level of functioning, activity, and participation was unique for each patient, an individual rehabilitation program was selected for each patient in accordance with changes in the functional state of the person receiving rehabilitation assistance [14]. The rehabilitation intervention at this stage lasted 21 days. Patients were directly involved in the development, implementation, and amendment of their rehabilitation program. The actual changes in the functional state of the person and the reaction to the therapy were taken into account. Physical activity was increased gradually. The duration of therapeutic exercises was determined strictly individually, taking into account the patients' condition, the presence of other concomitant chronic diseases [2; 9]. The rehabilitation process was based on the principles of patient-centeredness, purposefulness, timeliness, consistency, continuity, consciousness and activity, individualization, gradualness, accessibility, and systematicity [2; 9]. The surgeon, family doctor, and gastroenterologist provided recommendations for scar care, exercise

Table 1

Demographics of patients by group

Group	Number of people in total	including women	including men	Average age, years
BG1	20	17	3	52.35
MG1	20	16	4	52.15
BG2	20	17	3	53.25
MG2	20	17	3	53.70

regimens, diet, and medication to patients in BG1 and BG2.

In patients of MG1 and MG2, physical therapy included the following means: breathing exercises (diaphragmatic breathing exercises with prolonged exhalation prevailed), exercises to strengthen the abdominal muscles on exhalation to avoid an increase in intra-abdominal pressure, exercises to stretch the anterior and lateral abdominal areas. Therapeutic exercises and functional training were used to improve motor performance (strength, coordination, and flexibility), depending on individual indicators. For patients with impaired endurance and aerobic capacity, cyclic aerobic exercises such as dosed walking and or cycling, Nordic walking, and terrenkur were also used. Also, according to indications, massage and scar management, wearing a postoperative bandage, kinesiotaping in case of diastasis, cognitive behavioral therapy in case of increased anxiety, training in health management, diet, calorie intake, physical activity, sleep management, etc. were used. The methodology of rehabilitation intervention for impaired function, activity, and participation of MG1 and MG2 is shown in more detail in Table 2.

The results of the dynamics of functioning, activity, and participation of middle-aged patients with CCC after LCC are presented in Table 3.

The results of the dynamics of functioning, activity, and participation of middle-aged patients with ACC after LCC are presented in Table 4.

Analyzing the results of functioning, activity and participation, there was no statistically significant difference between the groups before the intervention at the post-acute stage of rehabilitation. At discharge from the surgical department, patients in all groups had the following dysfunctions sleep function (b134), emotional function (b152), pain sensation (b280), respiratory function (b440), exercise tolerance function (b455), fatigue (b4552), digestive function (b515), bowel function (b525), trunk muscle strength (b7305), muscle endurance function (b740). The majority of patients had the following activity and participation limitations: walking long distances (d4501), washing body parts (d5100), controlling diet and physical fitness (d5701).

Analyzing the results of the initial examination, we can see that middle-aged patient after LCC, hoping for relief after surgery and discharge

Table 2

Methods of rehabilitation intervention of groups MG1 and MG2 in impaired function, activity and participation in middle-aged patients after LCC

Code, Body function	**A means of rehabilitation**
b134 Sleep functions	Positioning, sleep management
b152 Emotion functions	Behavioral cognitive therapy, pain management
b280 Pain sensation	Medications, therapeutic exercises
b440 Respiratory functions	Breathing and therapeutic exercises, cyclic aerobic exercises
b455 Exercise tolerance functions	Cyclic aerobic exercises, strength exercises
b4552 Fatigue	Cyclic aerobic exercises, therapeutic exercises, energy conservation management
b515 Digestion functions	Medications, therapeutic exercises, diet therapy, health management
b525 Defecation functions	Medications, therapeutic exercises, diet therapy, cyclic aerobic exercise, health management
b 7305 Trunk muscle strength	Strength, therapeutic exercises, cyclic aerobic exercises, Nordic walking
b740 Muscle endurance functions	Cyclic aerobic exercises, therapeutic and breathing exercises, strength exercises
Code, Activities and Participation	A means of rehabilitation
d4501 Walking long distances	Cyclic aerobic exercises, Nordic walking, therapeutic and strength exercises, auxiliary aids
d5100 Washing body parts	Ergotherapy aids, coordination exercises
d5701 Control of diet and physical fitness	Trainings on health management, diet, calorie intake, physical activity

Table 3

Results of the dynamics of functioning, activity and participation of middle-aged patients with CCC after LCC

Code ICF	Me [25%, 75%]				p-value			
	Group BG1		Group MG1		Wilcoxon T-test		Mann-Whitney U-test	
	before reha-bili-tation	after reha-bili-tation	before reha-bili-tation	after reha-bili-tation	Group BG1 before and after reha-bili-tation	Group MG1 before and after reha-bili-tation	Groups BG1 and MG1 before reha-bili-tation	Groups BG1 and MG1 after reha-bili-tation
b134	1 [2; 2]	1 [2; 2]	1 [2; 2]	1 [1; 1]	0.083	0.023	0.602	0.030
b152	1 [2; 2]	1 [2; 2]	2 [2; 2]	1 [1; 2]	0.059	0.001	0.621	0,018
b280	2 [2; 2]	1 [2; 2]	2 [2; 3]	1 [1; 2]	0.002	0.000	0.521	0,060
b440	1 [1; 2]	1 [1; 2]	1 [1; 2]	1 [1; 1]	0.083	0.001	0.843	0.023
b455	2 [2; 2]	2 [2; 2]	2 [2; 2]	2 [2; 2]	0.083	0.102	0.432	0.532
b4552	1 [2; 2]	1 [2; 2]	2 [2; 3]	1 [2; 2]	0.180	0.004	0.352	0.027
b515	1 [2; 3]	1 [2; 2]	2 [2; 2]	1 [2; 2]	0.180	0.083	0.949	0.746
b525	2 [2; 2]	2 [2; 2]	1 [2; 3]	1 [2; 2]	0.157	0.014	0.674	0.010
b7305	2 [3; 3]	2 [2; 3]	2 [2; 3]	2 [2; 2]	0.157	0.008	0.877	0.031
b740	2 [2; 2]	2 [2; 2]	1 [2; 2]	1 [2; 2]	0.317	0.317	0.276	0.212
d4501	1 [2; 2]	1 [2; 2]	2 [2; 2]	1 [2; 2]	0.157	0.096	0.569	0.935
d5100	0 [0; 1]	0 [0; 1]	0 [1; 1]	0 [0; 0]	0.317	0.002	0.348	0.031
d5701	2 [2; 3]	2 [2; 2]	2 [2; 3]	1 [2; 2]	0.083	0.001	0.795	0.030

Table 4

Results of the dynamics of functioning, activity and participation of middle-aged patients with ACC after LCC

Code IFF	Me [25 %, 75 %]				p-value			
	Group BG2		Group MG2		Wilcoxon T-test		Mann-Whitney U-test	
	before reha-bili-tation	after reha-bili-tation	before reha-bili-tation	after reha-bili-tation	Group BG2 before and after reha-bili-tation	Group MG2 before and after reha-bili-tation	Groups BG2 and MG2 before reha-bili-tation	Groups BG2 and MG2 after reha-bili-tation
b134	1 [2; 2]	1 [2; 2]	1 [2; 2]	1 [1; 1]	0.317	0.000	0.916	0.000
b152	1 [2; 3]	1 [2; 2]	1 [2; 3]	1 [1; 2]	0.157	0.002	0.956	0.033
b280	2 [2; 2]	1 [2; 2]	2 [2; 2]	1 [1; 2]	0.025	0.004	0.766	0.246
b440	1 [2; 2]	1 [1; 2]	1 [1; 2]	0 [1; 1]	0.180	0.001	0.976	0.031
b455	2 [2; 2]	1 [2; 2]	2 [2; 2]	1 [2; 2]	0.102	0.070	0.769	0.564
b4552	2 [2; 2]	2 [2; 2]	2 [2; 2]	1 [2; 2]	0.083	0.005	0.485	0.037
b515	1 [2; 3]	1 [2; 3]	2 [2; 3]	2 [2; 3]	0,180	0.102	0.501	0.530
b525	2 [2; 3]	2 [2; 2]	2 [2; 3]	1 [2; 2]	0.180	0.001	0.815	0.002
b7305	2 [3; 3]	2 [2; 3]	2 [3; 3]	2 [2; 3]	0.157	0.059	0.752	0.613
b740	2 [2; 2]	2 [2; 2]	2 [2; 2]	2 [2; 2]	0.102	0.317	0.509	0.752
d4501	2 [2; 2]	2 [2; 2]	2 [2; 2]	2 [2; 2]	0.102	0.180	0.433	0.724
d5100	1 [2; 2]	1 [2; 2]	1 [2; 2]	0 [1; 1]	0.180	0.000	0.665	0.000
d5701	2 [3; 3]	2 [2; 3]	2 [2; 3]	1 [2; 2]	0.083	0.001	0.643	0.001

to home, had existing dysfunctions, decreased activity and participation, which undoubtedly required the development of individual rehabilitation programs.

When comparing the results of the primary and secondary assessment (after 21 days), a statistically significant difference ($p<0,05$) in pain relief (b280) was observed in BG1 and

BG2, indicating positive tissue regeneration after surgery and the success of symptomatic drug support in the subacute rehabilitation period by the attending physician and/or gastroenterologist.

When comparing the results of functioning and participation of patients with CCC (in the MG1 group) before and after rehabilitation, a statistically significant difference ($p<0.05$) was found, namely a decrease in the level of dysfunctions and limitations in such indicators as sleep function (b134), emotional function (b152), pain sensation (b280), respiratory function (b440), fatigue (b4552), bowel function (b525), trunk muscle strength (b7305), washing body parts (d5100), control over diet and physical fitness (d5701), which indicates the effectiveness of the implemented individual rehabilitation programs at the subacute stage of rehabilitation. There was no statistically significant difference in the following indicators in patients of MG1 with CCC: physical activity tolerance function (b455), digestive function (b515), muscle endurance function (b740), long-distance walking (d4501).

When comparing the results of functioning and participation of patients with ACC (in the MG2 group) before and after rehabilitation, a statistically significant difference ($p<0.05$) was found, namely a decrease in the level of dysfunctions and limitations in the following indicators sleep function (b134), emotional function (b152), pain sensation (b280), respiratory function (b440), fatigue (b4552), defecation function (b525), washing of body parts (d5100), control over diet and physical fitness (d5701), which indicates the effectiveness of the implemented individual rehabilitation programs at the subacute stage of rehabilitation. In patients of MG2 with ACC, there was no statistically significant difference in the following indicators: trunk muscle strength (b7305), physical activity tolerance (b455), digestive function (b515), muscle endurance function (b740), long-distance walking (d4501).

Discussion.

Patients of all groups after LCC at discharge from the surgical department had complaints of abdominal pain, gastrointestinal tract (GIT) disorders, dyspeptic manifestations, and decreased performance. In professional scientific sources, the totality of these complaints in patients after cholecystectomy is denoted by the term "Postcholecystectomy syndrome" [1; 19].

In fact, individualized rehabilitation programs for middle-aged patients after cholecystectomy using a biopsychosocial approach aimed at solving specific tasks (short-term and long-term goals) aimed at activity and participation have an equally positive effect on the level of activity and participation of patients with ACC and CCC. However, in patients with ACC, unlike patients with CCC, there was no improvement in trunk muscle strength function, which may indicate the presence of residual inflammation and the effects of intoxication in ACC, This, in turn, leads to patients' avoidance of strength exercises.

In our opinion, the lack of positive dynamics in patients of MG1 and MG2 in terms of physical activity tolerance function, digestive function, muscle endurance function, and long-distance walking requires longer rehabilitation interventions to achieve statistically significant changes.

Breathing therapeutic exercises can have a positive effect on the quality of sleep and emotions (reducing anxiety) [13]. Inadequate treatment of anxiety in the early postoperative period prolongs recovery and increases the risk of postoperative complications [18].

Researchers also argue that breathing exercises and stimulus spirometry can be effective in reducing pain and nausea in patients undergoing cholecystectomy with laparoscopy [20; 21].

A group of authors point out that patients who have undergone cholecystectomy are at increased risk of fractures, which confirms the need to include strength and functional exercises in individual rehabilitation programs [4].

The importance of including health management, diet, calorie intake, and physical activity training in rehabilitation programs for patients after LCC is confirmed by the authors, who indicate that there is a link between biomarkers of insulin resistance and the prevalence of gallstone disease, body mass index, and cholelithiasis. New cross-associations

of gallstone disease prevalence were found for biomarkers of systemic inflammation, genetic risk of obesity or type 2 diabetes, high levels of high-density lipoprotein, and alcohol consumption [3]. Patients' alcohol consumption and smoking can further lead to the development or exacerbation of pancreatic diseases [22]. Scientists point out that stroke prevention measures should be implemented for patients with HCV, especially for those with stroke risk factors [13].

Conclusions.

In the post-acute period of rehabilitation, individual rehabilitation programs for middle-aged patients after LCC using a biopsychosocial approach aimed at solving specific problems (short-term and long-term goals) aimed at activity and participation lasting 21 days can positively affect the reduction of dysfunctions and limitations in such indicators as: sleep function, emotions, respiratory function, fatigue, defecation function, washing of body parts, control over diet and physical fitness. Patients after LCC with decreased trunk muscle strength, exercise tolerance, digestive function, muscle endurance, and long-distance walking should continue rehabilitation interventions for long-term rehabilitation periods.

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