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REHABILITATION OF PATIENTS WHO HAVE UNDERGONE COVID-19

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Abstract

Introduction. Patients who have suffered pneumonia caused by COVID-19, after discharge from the hospital and return to normal life, face violations of the function of external respiration, limitations of physical performance, social and psycho-emotional functioning. The importance of rehabilitation during COVID-19 has been emphasized by the World Health Organization, the main purpose of which is to improve respiratory symptoms, preserve functions and reduce complications, as well as prevent disability.

The aim of our study is to evaluate the effectiveness of rehabilitation measures in those patients who have undergone COVID-19.

Materials and methods. A descriptive retrospective study. The case histories of patients who have passed all stages of rehabilitation after COVID-19 for one year in 3 organizations of the city of Almaty have been studied. The study included patients who had completed three full stages of rehabilitation. Of all 150 people, only 55 have passed the 3rd stage of medical rehabilitation. The recovery program after COVID-19 was developed individually. The rehabilitation plan included physical therapy, kinesiotherapy, massage, physiotherapy, mechanotherapy, psychological correction. The effectiveness of rehabilitation measures was assessed on the basis of specific scales and functional tests.

Results. The indicator of the rehabilitation routing scale in patients who underwent COVID-19 after a course of rehabilitation significantly increased. According to the modified MRC dyspnea scale, an average degree of 2 points was determined in all 55 patients, after the course it turned into a mild degree of 1 point. According to the functional test of a six-minute walk, functional class II was determined in all patients before rehabilitation, after class I. Before rehabilitation, the Barthel Index was determined at an average of 75 points, after 90 points. The Saturation Index before the courses was determined at an average of 90 percent, after 97 percent.

Conclusion. All indicators increased statistically significantly after, which confirms the effectiveness of passing all stages of medical rehabilitation for patients who have undergone COVID-19.

Keywords. Rehabilitation, COVID-19, scale, quality of life, physiotherapy.

Резюме

РЕАБИЛИТАЦИЯ ПАЦИЕНТОВ, ПЕРЕНЕСШИХ COVID-19

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Введение. Пациенты, перенесшие пневмонию, обусловленную COVID-19, после выписки из стационара и возвращения к обычной жизнедеятельности, сталкиваются с нарушениями функции внешнего дыхания, ограничениями физической работоспособности, социального и психоэмоционального функционирования. Важность реабилитации при COVID-19 была подчеркнута Всемирной организацией здравоохранения, основной целью которой является улучшение респираторных симптомов, сохранение функций и уменьшение осложнений, и предотвращение инвалидности.

Целью нашего исследования является оценка эффективности реабилитационных мероприятий, у пациентов перенесших COVID-19.

Материалы и методы. Описательное ретроспективное исследование. Изучены истории болезни пациентов, прошедших все этапы реабилитации после COVID-19 в течении одного года в 3-х организациях города Алматы. На исследование были взяты пациенты, прошедшие три полных этапа реабилитации. Из всех 150 человек только 55 прошли 3-й этап медицинской реабилитации. Программа восстановления после COVID-19 разрабатывалась индивидуально. План реабилитационных мероприятий включал в себя лечебную физкультуру, кинезиотерапию, массаж, физиопроцедуры, механотерапию, психологическую коррекцию. Эффективность реабилитационных мероприятий оценивалась на основании специфических шкал и функциональных тестов.

Результаты. Показатель шкалы реабилитационной маршрутизации у пациентов, перенесших COVID-19, после курса реабилитации значительно повысились. По модифицированной шкале одышки mMRC у всех 55 пациентов определялась средняя степень в 2 балла, после курса перешла в легкую степень в 1 балл. По функциональному тесту шестиминутной ходьбы у всех пациентов до реабилитации определялся функциональный класс II, после I. До реабилитации Индекс Бартела определялся в среднем в 75 баллов, после в 90 баллов. Показатель сатурации до проведения курсов определялся в среднем в 90 процентов, после в 97 процентов.

Выводы. Все показатели статистически значимо повысились после, что утверждает об эффективности прохождения всех этапов медицинской реабилитации пациентам, перенесших COVID-19.

Ключевые слова. Реабилитация, COVID-19, шкала, качество жизни, физиотерапия.

Түйіндеме

COVID-19 ЖҰҚТЫРҒАН НАУҚАСТАРДЫ ОҢАЛТУ

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Кіріспе. Ауруханадан шыққаннан кейін және қалыпты өмірге оралғаннан кейін COVID-19 туындаған пневмониямен ауыратын науқастар сыртқы тыныс алу функциясының бұзылуына, физикалық өнімділіктің, Әлеуметтік және психоэмоционалды жұмысының шектеулеріне тап болады. Дүниежүзілік денсаулық сақтау ұйымы COVID-19 кезінде оңалтудың маңыздылығын атап өтті, оның негізгі мақсаты тыныс алу белгілерін жақсарту, функцияларды сақтау және асқынуларды азайту және мүгедектіктің алдын алу болып табылады.

Мақсаты. COVID-19 жұқтырған науқастарда оңалту шараларының тиімділігін бағалау.

Материалдар мен әдістер. Зерттеу дизайны сипаттамалық ретроспективті зерттеу болып табылады. Алматы қаласының 3 ұйымында бір жыл ішінде COVID-19-дан кейін оңалтудың барлық кезеңдерінен өткен пациенттердің ауру тарихы талданды. Зерттеуге оңалтудың үш толық кезеңінен өткен пациенттер енгізілді. Барлық 150 адамның 55-і ғана медициналық оңалтудың 3-ші кезеңінен өтті. COVID-19 қалпына келтіру бағдарламасы жеке әзірленді. Оңалту жоспарына физиотерапия, кинезиотерапия, массаж, физиотерапия, механотерапия, психологиялық коррекция кірді. Оңалту шараларының тиімділігі арнайы шкалалар мен функционалдық тестер негізінде бағаланды.

Нәтижелер. Оңалту курсынан кейін COVID-19 жұқтырған науқастарда оңалтуды бағыттау шкаласының көрсеткіші айтарлықтай өсті. Модифицирленген MRC өлшеу шкаласына сәйкес, барлық 55 пациенттің орташа дәрежесі болса, курстан кейін ол жеңіл дәрежеге ауысты. 6 минуттық жаяу жүру функционалдық тестінің мәліметтері бойынша барлық пациенттерде оңалтуға дейін функционалдық II класс, кейін I функционалдық класс анықталды. Оңалтуға дейін Бартел индексі орта есеппен 75 балл, кейін 90 балл деңгейінде анықталды. Курс алдында сатурация көрсеткіші орта есеппен 90 пайыз болса, курстан кейін 97 пайыз анықталды.

Қорытынды. Оңалтудан кейін барлық көрсеткіштер статистикалық тұрғыдан айтарлықтай өсті. Бұл COVID-19 жұқтырған пациенттердің медициналық оңалтудың барлық кезеңдерінен өту тиімділігін растайды.

Түйінді сөздер. Оңалту, COVID-19, шкала, өмір сүру сапасы, физиотерапия.

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Introduction

Coronavirus disease 2019 (COVID-19) is a highly contagious viral disease that causes acute respiratory syndrome 2 (SARS-CoV-2). The virus, first detected in Wuhan, Hubei Province, China, at the end of December 2019, led to the death of more than 6 million people.

The characteristics and consequences of COVID-19 vary greatly from study to study. A systematic review revealed that COVID-19 is associated with severe disease (23%) and mortality (6%) of infected people. Also, the authors of this study recommend the need for follow-up among people with concomitant diseases and clinical signs. [11]

Studies on respiratory rehabilitation in COVID-19, which are available today, are mainly based on recommendations for other respiratory diseases (for example, for chronic obstructive pulmonary diseases, interstitial lung diseases or asthma), and not on special protocols and techniques for COVID-19. [15, 14]

It is known that patients who have suffered pneumonia caused by COVID-19, after discharge from the hospital and return to normal life, face impaired respiratory function, limitations of physical performance, social and psycho-emotional functioning. [2]

Another systematic review examined the effectiveness of rehabilitation interventions for people with post-acute COVID-19 syndrome. The results showed that rehabilitation helps to reduce shortness of breath, anxiety and kinesiophobia, and improvements in muscle strength were also found. [13, 9] The importance of rehabilitation in COVID-19 was emphasized by the World Health Organization (WHO), which focuses on the introduction of integrated care models for the treatment of conditions after COVID-19.

Medical rehabilitation of COVID-19 should include all components of rehabilitation measures aimed at the speedy restoration of vital body functions, improving the quality of life of patients and preventing complications. [7, 17]

The aim of our study is to evaluate the effectiveness of rehabilitation measures in those patients who have undergone COVID-19.

Materials and methods of research. The design of the study is a retrospective analysis. The case histories of patients who passed all stages of rehabilitation after COVID-19 in the period from 01.03.2020 to 01.03.2021 in 3 organizations of the city of Almaty were studied. Rehabilitation was carried out in round-the-clock and day rehabilitation hospitals. Patients over the age of 18 who had suffered COVID-19 were admitted to rehabilitation. These patients had no contraindications for medical rehabilitation,

had rehabilitation potential and their condition was assessed on the rehabilitation routing scale of 1, 2, and 3 points according to the order of the Ministry of Health of the Republic of Kazakhstan dated October 7, 2020 No. № RK MOH 116/2020.

The study included patients who had completed three full stages of rehabilitation. Of all 150 people, only 55 have passed the 3rd stage of medical rehabilitation.

The following parameters were taken into account during rehabilitation: severity of the coronavirus infection; clinical manifestations; degree of lung damage; gender; age; concomitant diseases.

The duration of the rehabilitation course averaged 10 days. The recovery program after COVID-19 was developed individually. The individual rehabilitation plan included:

1. Flexible routine.
2. Physical therapy: breathing exercises to improve the drainage function of the bronchi and respiratory function of the lungs, Strelnikova's exercises, kinesiotherapy in active and passive mode according to indications;
3. Chest area massage (manual relaxing, toning);
4. Physiotherapy (no more than 2-3 types of procedures during the course): medicinal electrophoresis; magnetotherapy; spleocamera; ultraviolet irradiation; bioptron; aerosol therapy; oxygen cocktail; shungite therapy;
5. Mechanotherapy: treadmill, cobra, vacumed;
6. Terrencourt.
7. Psychological correction.

The time, duration and interval of each procedure were selected according to the individual patient indicator. The effectiveness of rehabilitation measures was assessed on the basis of the following criteria:

1. Rehabilitation routing scale based on the criteria of the International Classification of Functioning, Disability and Health (ICF);
2. Assessment of the severity of dyspnea on the mMRC scale (Modified Medical Research Council);
3. Assessment of exercise tolerance, performance and the six-minute walk test;
4. Assessment of the level of daily activity and measurement of the quality of life according to the Barthel index;
5. Assessment of blood SpO₂ by oxygen by pulse oximetry;

All scales and functional tests were performed before and after medical rehabilitation. The Statistical Package for Social Sciences (SPSS) version 28.0 was used to statistically analyze the data. The pre-to-post outcome measure changes were evaluated by Wilcoxon signed rank test or by χ^2 tests.

Results

The average age of all examined patients was 49 years (range from 18 to 75 years), and the sex ratio was 22 (40%): 33 (60%) (men: women). During a retrospective study, data from 55 patients were analyzed.

After rehabilitation, patients demonstrated the following improvements. Before the start of medical rehabilitation, the frequency of occurrence on the rehabilitation routing scale of 3 points in 15 patients (27.3%), after the course was not determined in any; rehabilitation routing scale of 2 points in 40 patients (72.7%); after the course in 13 patients (23.6%); also, the scale of the rehabilitation route in 1 score in 42 patients 76.4%) (Table 1).

Table 1.

Dynamics of indicators of the rehabilitation routing scale in patients who underwent COVID-19 before and after the rehabilitation course.

Rehabilitation routing scale	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Frequency
1	-	-	1	-
2	40	72,7	2	40
3	15	27,3	3	15

On the first day before the start of the rehabilitation course, according to the modified MRC dyspnea scale, an average degree of 2 points was determined in all 55 patients, after the course it turned into a mild degree of 1 point (Table 1).

Table 2.

Dynamics of the decrease in the severity of dyspnea in patients who underwent COVID-19 on the modified mMRC dyspnea scale before and after the rehabilitation course.

Modified MRC dyspnea scale	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Frequency
1	-	-	55	100,0
2	55	100,0	-	-

According to the functional test of a six-minute walk, functional class II was determined in all patients before rehabilitation, and functional class I after the rehabilitation course. Before rehabilitation, the Barthel Index was determined on average at 75 points, after the course at 90 points. The overall Barthel Index score ranges from 0 (maximum dependency level) to 100 (full autonomy). A score of ≤70 corresponds to severe dependence. In our case, patients have significantly improved their results from severe to complete autonomy. The Saturation Index before the courses was determined at an average of 90 percent, after 97 percent (Table 1).

Table 3.

Dynamics of indicators of functional tests in patients who underwent COVID-19 before and after rehabilitation.

Indicator	Pre-test Me (Q1-Q3)	Post-test Me (Q1-Q3)	p
Six-minute walk test	323,0 (313,0-359,0)	436 (430,0-461,0)	<0,001
Barthel Index	75,0(75,0-75,0)	90 (90,0-90,0)	<0,001
SpO2	90,0 (90,0-92,0)	97,0 (95,0-97,0)	<0,001

Moreover, the results of pre and posttests showed that $p < 0.001$, which means there is a significant difference between pretest and posttest conditions.

Discussion

The results obtained give grounds to assert that the passage of all stages of rehabilitation of patients who have undergone COVID-19 is effective. The absence and reduction of symptoms as a result of rehabilitation will undoubtedly affect the quality of life. In a study conducted in Italy, Belgium and Portugal, similar to our study in patients evaluating the Barthel Index, a six-minute walk test, similar results were obtained. In the study conducted in Italy and Portugal, the Barthel Index improved from 55.0 (30.0–90.0) to 95.0 (65.0–100.0) ($p = 0.00$). In Belgium, the authors write about achieving positive results on the test of a six-minute walk of 96 meters. [18, 8, 4] Moreover, our study also shows that the level and severity of concomitant diseases in patients who have undergone COVID-19 do not affect the results of pulmonary rehabilitation. [12] The Saturation Index is one of the key indicators for diagnostics worldwide, after rehabilitation treatment. [19, 16] We assessed the degree of dyspnea in patients with COVID-19 on the mMRC scale in the same way as in other European countries. [5, 10] As stated in the review study, the scales and functional tests used to assess the effectiveness of rehabilitation in our country coincide with most foreign countries. [3] In the review of the recommendation, the authors report on the importance of all stages and types of rehabilitation services after COVID-19, in order to improve respiratory symptoms, preserve function and reduce complications and prevent disability. [1] The limitation of this research is the inability to fully study respiratory indicators, which would be important when choosing an accurate method of rehabilitation [6,19]. The absence of a control group makes it impossible to compare with natural recovery. It is possible to include a comparative group in order to develop the study. High-quality studies of the effectiveness of rehabilitation and long-term monitoring of the disease and its consequences have yet to be carried out.

Conclusion.

All indicators increased statistically significantly after rehabilitation, which confirms the effectiveness of passing all stages of medical rehabilitation for patients who have undergone COVID-19. The results obtained give grounds to assert that the passage of all stages of rehabilitation of patients who have undergone COVID-19 is effective. The results may be useful for the leadership of a multidisciplinary group headed by rehabilitation doctors who provide care to patients who have survived COVID-19 infection.

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