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D. M. Boyko

Ukrainian Medical Stomatological Academy, Poltava

MEDICAL REHABILITATION OF A PATIENT WITH UNCONTROLLED ASTHMA: 10 YEARS OF OBSERVATION

Key words: *bronchial asthma, obstruction, medical rehabilitation.*

Asthma belongs to the group of the most common non-infectious diseases that occurs in 1 to 18 % of the population in different countries [8]. In Ukraine, the prevalence of asthma is ≥ 10.1 % [14], and the incidence is 10.514 per 100,000 adults [3]. Among patients with asthma, the proportion of patients with a severe and uncontrolled course can reach 10 % [10]. The cost of their treatment amounts to 60 % of all costs associated with asthma [6], and according to economic losses, it is approaching or exceeding the level of expenditures for patients with diabetes mellitus, cirrhosis, schizophrenia and chronic obstructive pulmonary disease (COPD) [5, 6]. The phenotype of uncontrolled asthma, with constant airflow obstruction [4], requires a larger amount of health care resources compared to other categories of asthma patients [1, 11].

A patient with uncontrolled or severe asthma can be treated effectively provided that there is an organized comprehensive pulmonary care at the outpatient stage. At the same time, such comprehensiveness is achieved by combining guideline-directed medical therapy together with non-pharmacological support. Additionally, it is fully in order with a modern understanding of broad possibilities in medical rehabilitation [15]. In such a case, its obligatory component should be pulmonary rehabilitation, which in turn, positively affects the functional capabilities, psychoemotional state as well as the quality of life of patient with asthma, therefore reducing the manifestation of asthma symptoms [15]. A separate point must be made about the fact that moderate physical activity in patients with asthma can significantly reduce the frequency of exacerbations, especially in older women [7]. A clinical case presented below illustrates the noteworthy potential of using rehabilitation technologies in patients with uncontrolled asthma, even with minimal procurement and limited health care resources.

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Clinical case

Patient A. (58-year-old woman) sought medical attention on an outpatient basis for asthma. She complained of the presence of sputum in the bronchi, feeling of compression in the chest, shortness of breath during insignificant physical activity (usual household chores), anxiety. The patient has been suffering from atopic asthma and allergic rhinitis for 25 years; repeatedly treated on an outpatient basis and as an in-patient. 12 months before the visit, there had been an episode of emergency hospitalization to an intensive care unit due to acute asthma exacerbations. Systemic corticosteroid use experience is over 20 years. Current therapy: Triamcinolone 8 mg once daily, Salbutamol for up to 8 inhalations per day if needed.

Physical examination (19/06/2008) revealed signs of severe respiratory failure and symptoms of bronchial obstruction (wheezing) presented by coarse whistling sounds. Also, there were observed retractions of supraclavicular, infraclavicular regions and intercostal spaces, as well as the involvement of accessory muscles of respiration. On auscultating — coarse whistling sounds (wheezing) on the right and left sides. The examination of the musculoskeletal system revealed that, the strength of the muscles in the upper limbs was such that for raising the right limb, patient had to support it by the left one.

Naturally, such changes were associated with significant functional impairment in the daily life of the patient and made it hard to maintain simple daily routines (getting dressed, making food, daily hygiene etc.).

The patient looked exhausted, i.e. having an inadequate nutritional status. However, the value of the body

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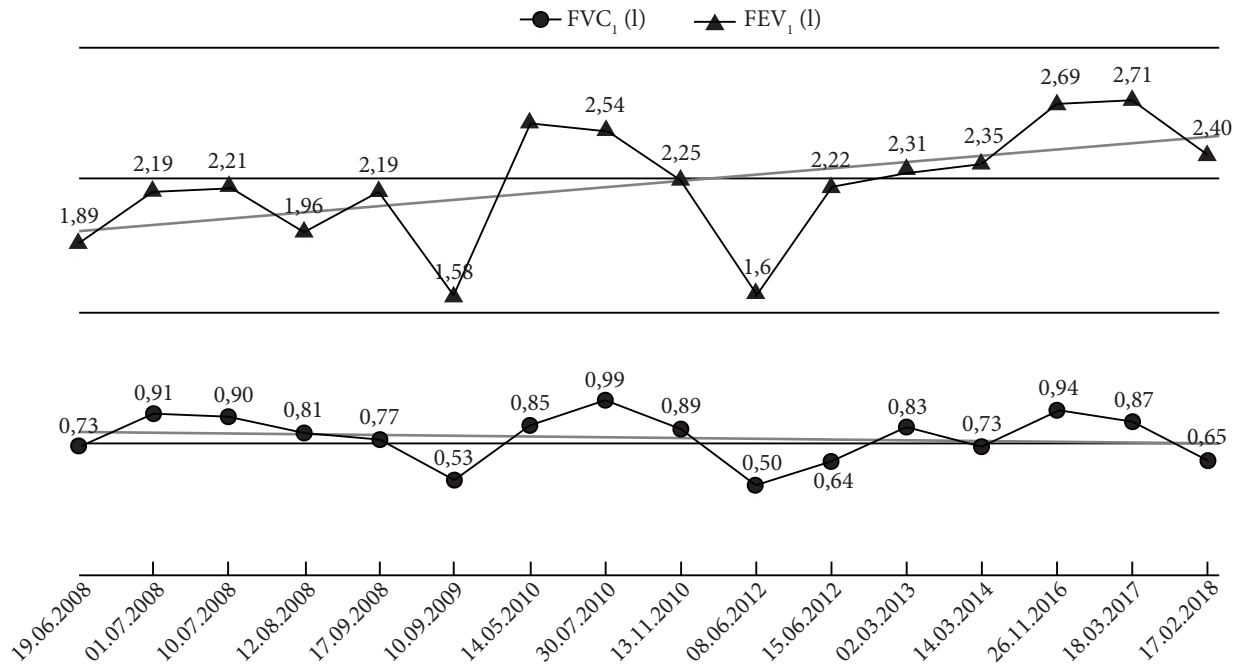

Fig. 1. Indicators dynamics in the patient pulmonary function for the last 10 years.

mass index (BMI) at 18.7 was within the reference intervals [12]. Peripheral capillary oxygen saturation (SpO2) at rest didn't drop below the normal (≥ 95 %) (June 19, 2008) [13]. CBC from 01.07.2008 showed a high level, about 17 %, of eosinophils. The pulmonary function test data are displayed below (Fig. 1).

The forced expiratory volume per first second (FEV1) at the initial visit (June 19, 2008) was at a rather low level (0.73L / 29 % of the required). After conducting bronchodilator reversibility test with 400 μg of salbutamol FEV1 increased by 70 ml and the forced vital capacity rose (FVC) by 130 ml compared to the initial values (1.89 % / 64 % of the required), thus indicating the stable nature of the broncho-obstructive changes and significantly restricted rehabilitation intensity

From 2008 to 2010, measures were taken to phase out systemic glucocorticosteroids (GC) and to select the baseline treatment of asthma according to international recommendations [2, 8, 9, 12] (Figure 2).

First of all, we specified a place for rehabilitation activities. The most suitable option was the organization of rehabilitation in outpatient settings under the supervision of a physician. The process of organization and all activities for medical rehabilitation were planned by the pulmonologist in view of the peculiarities in the local health system. However, the standard practice is to involve a multidisciplinary team, which includes: a pulmonologist, a physiotherapist, a nurse, a

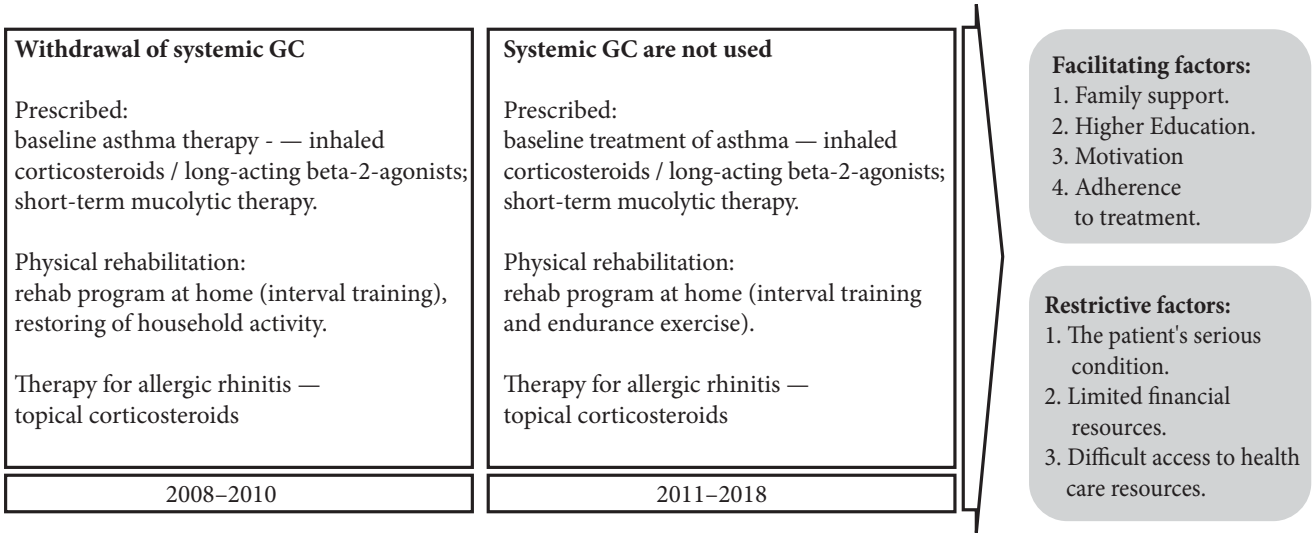

Fig. 2. The algorithm of the steps in medical rehabilitation

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nutritionist, a psychotherapist, an occupational therapist, methodologist, occupational pathologist, social worker [15].

The next important aspect is the duration of the program. The most reasonable period is at least 8 weeks [2, 8, 15]. But as we can see regarding this clinical case, the implementation of such rehab programs in outpatient settings, which is carried out over a longer period of time (over 10 years), also proved to be effective. Although one observation cannot compete with the evidential effect of a multicenter, placebo-controlled, randomized study, the results of one certain patient suggest that there is a prospect for wider implementation of medical rehabilitation both in practical and scientific areas while treating patients with asthma. The frequency of exercise should not be less than 3 times a week, but it is desirable that this activity involves most days of the week [15].

Among the exercises used as physical training for patients in the pulmonary profile, predominant are walking, cycling and upper limb movements in sitting position. Intensity of physical activity is based on the dynamics of maximum heart rate (up to 75 %) and on intensity of dyspnea and fatigue symptoms at the level of 4 to 6 points on the Borg scale. The total exercise time for endurance should be 20 to 60 minutes per session, due to the peculiarities of the associated bioenergetic processes in the human body and explicitly in the muscles. Interval exercises allow you to train strength indicators without having a significant effect on the clinical symptoms of the disease. A peculiarity of such exercises is a short period of load (from 30 to 60 seconds), which is rapidly changing with rest [2, 8, 15]. Training of inspiratory muscles, long-term oxygen therapy, non-invasive lung ventilation, neuromuscular electrical stimulation – were not conducted due to the lack of evidence for these measures and the existence of objective barriers for their practical implementation.

The severity of the patient's condition and her individual characteristics of her led to the decision about maximum simplification of the physical training methods and reducing the frequency of physician attendance while increasing the number of remote consultations by phone. After an instructional training with the patient and her family, physical rehabilitation was initiated in the form of interval exercises and restoration of daily household skills. Interval exercises were designed in the form of lifting the weight by hands in a sitting position. To achieve adherence to exercises, the load was distributed throughout the day (the patient had to raise the maximum possible amount of weight in kg per day). When functional capability was restored in the upper limbs - the patient began to increase the walking distance, which gradually increased to 20 m / day (Table 1). At the end of 2010, the patient was fully able to take care of herself and move freely around the flat as well as do the housework without restrictions.

After the patient saw a real improvement in her abilities, there was an increase in motivation and adherence to treatment which allowed to expand motion activity (up to additional distance in ≥ 3000 m) and increase the total amount of muscle-strengthening exercises per day by 10 times (Table 1).

Table 1.Results of complex medical rehabilitation

Index	2008 p.	2018 p.
Body weight (kg)	48	82
Body Mass Index (BMI)	18,7	32,2
Walking distance (m / day)	0 to 20	≥ 3000
Weight lifting (kg / day)	0 to 27	≥ 200

The body mass index (BMI) of the patient in 2018 was somewhat exaggerated, however, it did not restrict her from doing physical activity (Table 1). Further on, the BMI will represent the need for measures to maintain a balance between consumption and energy expenditure.

Family support, high level of education and constant motivation, all of this contributed to patient's commitment to the course of treatment, despite a number of factors that prevented from carrying out the tasks assigned by the doctor (Fig 2).

During more than 10 years of observation, since the commencement of comprehensive rehabilitation, no hospitalization and ambulance emergency calls have occurred.

Summing up, we can say that the severity of obstructive disorders from the start of treatment varied somewhat, however, but did not undergo significant changes. The nature of the patient's physical abilities evolved from problems with the accomplishment of simple household tasks to the ability to independently take care of relatives with persistent functional disorders. The level of social activity has reached such heights that the patient is happy to share with young doctors her experience of coping with the illness. Thus, on her own example, she shows the effectiveness of physical rehabilitation activities.

An important marker of efficiency in comprehensive approach to the management of this patient can also be the absence of severe asthma exacerbations requiring hospitalization and use of systemic GC.

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Abstract

Bronchial asthma (BA) belongs to the group of the most common non-infectious diseases, which occurs in 1 to 18 % of population in different countries. Among patients with BA, the proportion of ones with uncontrolled course may be about 10 %. The cost of their treatment reaches 60 % of all expenses associated with asthma. The phenotype of uncontrolled asthma with permanent bronchial obstruction requires more health protection resources compared to those for other categories of patients with asthma.

It is possible to effectively treat a patient with uncontrolled or severe asthma, if the provision of comprehensive pulmonary care at the outpatient stage is organized. At the same time, the effect of complexity is achieved by combining adequate pharmacological and non-pharmacological support, using all the possibilities of modern medical rehabilitation. The presented clinical case clearly illustrates the wide circle of opportunities for the rehabilitation technologies use in patients with uncontrolled asthma, even with minimal material and technical support and limited resources of the health care system.

Key words: bronchial asthma, obstruction, medical rehabilitation.

Dmytro M. Boiko
Doctor of Medical Science, Docent
Head of Department of Physical Education and Health,
Physical rehabilitation, Sports medicine High State e
ducational institution of Ukraine "Ukrainian Medical Somatological Academy"
36011, Poltava, st. Shevchenko, 23,
+38 (066) 4464003, e-mail: dim.xata@gmail.com
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Boiko D. M.
ORCID iD
https://orcid.org/0000-0001-9296-6213

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