FEATURES OF CARDIAC REHABILITATION IN OLDER AGES

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Abstract. The article discusses current issues of physical training for elderly patients, including using our own data on electrical stimulation of skeletal muscles, and proposes further development of research on this issue.

Keywords: cardiac rehabilitation, method, treatment, older age groups.

INTRODUCTION

What are the features of physical rehabilitation in old age? First of all, in older age groups, stress tests are required to assess functional capabilities, select training regimens, diagnose myocardial ischemia and risk stratification. However, such tests are performed less frequently in older patients than in younger patients, and in equal proportions for cardiac and non-cardiac reasons [3]. The latter include chronic lung disease, peripheral arterial disease, degenerative arthritis, patient inability to handle exercise testing equipment, and clinician reluctance to exercise patients. It should be remembered that failure to perform stress tests is an empirical indicator associated with an unfavorable prognosis in elderly cardiac patients. The negative prognostic value in such cases is revealed regardless of the cause of functional disorders. For patients who are unable to perform tests with increasing load, it is advisable to use alternative methods of ergometric assessment. Thus, with a 6-minute walk test, it is possible to achieve a load level of 79–90% of maximum oxygen consumption (MOC), depending on the functional class of patients. This test in patients of older age groups has high reproducibility, prognostic value, does not require special skills from the subject, and is suitable for use in weakened patients [4].

MATERIALS AND METHODS

Perhaps this is not only due to organizational and financial restrictions, but also the inability of patients to perform the usual training loads designed for younger people, for example, due to the presence of signs of sarcopenia. Specific training regimens can improve tolerance and adherence to training programs. For people in older age groups, dosed walking and interval aerobic training [2] are more suitable than training on exercise machines with constant intensity [3]. To correct muscle maladjustment in old age, the use of resistive loads is proposed [4], which is not always possible in cardiac patients, so the search for new methods of rehabilitation continues. A key factor for older people is the strength of the lower limb muscles, which determines, for example, the risk of falls and the level of daily activity. Therefore, it is advisable to carry out interventions aimed at increasing the functional state of the muscles of the lower extremities [2].

RESULTS AND DISCUSSION

One of these methods has recently become electrical stimulation of skeletal muscles (EMS), which is used in European countries mainly in patients with chronic heart failure (CHF). At the same time, the effect of EMS on muscle strength and endurance is emphasized, which is especially useful for patients with sarcopenia. It was noted that the EMS course was most effective in severe patients: 6-minute walking distances and endothelium-dependent vasodilation increased to a greater extent in patients with functional class III–IV CHF (FC) compared to patients with FC II. This was accompanied by a large decrease in the level of brain natriuretic peptide and perceived psycho-emotional stress. In addition, the majority of patients with FC III–IV remained committed to training for an additional 3 months compared with patients with FC II (76.9 vs. 55.6%, $p<0.001$). The latter is especially important for older patients, who are usually less compliant with physical rehabilitation programs.

The studies of our scientific group noted successful experience in using EMS in inpatient rehabilitation of patients with MI over 70 years of age with a low

initial muscle status. The possibility of increasing the strength and endurance of the muscles of the lower extremities, increasing the distance of a 6-minute walk and the threshold load power during bicycle ergometry has been proven. At the same time, an improvement in the psychological status and the absence of an adverse effect of this type of training on the processes of post-infarction cardiac remodeling, autonomic balance and arrhythmogenic status were noted [3]. When using EMS training in patients with coronary artery disease, after 10 weeks there was an increase in oxygen consumption at the level of the anaerobic threshold from 19.39±5.3 ml/kg/min to 24.25±6.34 ml/kg/min or by 25.4%, with the maximum individual increase in this indicator being 96% [3].

The potential of EMS as a new way to increase BMD not only in cardiac patients has been noted [1]. An example is the data on the use of EMS during long-term hospitalization of women in older age groups (age 82±7 years). After the EMS course, it was possible to increase the strength of the knee extensors (by 16–26%) and the 6-minute walking distance (by 9–14%), which was not observed in the control group [2]. Research has also been conducted on combining EMS with other types of training. In both healthy individuals and patients with CHF, the combined use of resistive loads and EMS does not cause additional hemodynamic load and pain in the muscles (both during training and within 24 hours after it) [3]. Adding an EMS course to aerobic training allows you to get an additional training effect [3]. Patients tolerate EMS well; there were no refusals to undergo it. This allows us to consider EMS as a promising way to involve patients in physical rehabilitation programs and increase daily activity in older age groups, allowing one to overcome psychological barriers of patients and medical limitations [2]. It is clear that rehabilitation interventions in patients of older age groups may include other combinations of various types of training influences. Thus, in the literature there are combinations of aerobic training with oriental tai chi gymnastics or hydrotherapy [3]. The authors of these methods were able to show an additional

increase in tolerance to physical activity and the quality of life of patients with combined effects.

Apparently, the greatest effect from training programs in elderly and senile people can be achieved with the additional use of a comprehensive geriatric assessment. This will allow recovery efforts to be individualized and focus on more important issues. Thus, in patients over 70 years of age in early rehabilitation after cardiac surgery, the functional state was studied using a battery of geriatric tests (need for assistance, chair rise test, walking speed, balance and stability assessment, 6-minute walk test). Based on the results of this assessment, an individual rehabilitation program was developed. In the group of such intervention, it was possible to increase the muscle strength, mobility, and stability of patients to a greater extent than in the control group ($p < 0.05$). Also, in the intervention group, the hospital stay of patients was shorter (17.5 ± 8 vs. 21 ± 4 days, $p = 0.0002$), and 91% of them were discharged in a condition not requiring outside care [38].

Psychological aspects of cardiovascular rehabilitation programs in the elderly are no less important. It should be noted that the lack of social connections and support increases overall mortality in men of older age groups. Age over 75 years is itself associated with an increased incidence of depressive symptoms, and living alone increases the prevalence of depression among such patients. At the same time, high social activity can affect these symptoms. According to the ENRICHD study, special behavioral interventions were able to reduce the incidence of depression and social isolation in patients after MI, but not the number of cardiovascular complications. At the same time, cardiac rehabilitation can reduce not only the prevalence of depressive symptoms, but also mortality. In addition, physical training after MI improves the prognosis of patients with depression and/or low social support. In patients aged 70–78 years, participation in cardiac rehabilitation programs at 4-year follow-up reduces the risk of death and MI. The association of reduced mortality with participation in exercise programs after myocardial infarction was also shown in people over 70 years of age in the

OMEGA study. However, persistence of depression reduces patients' adherence to secondary prevention and physical training after acute coronary syndromes. Recently published work by Canadian researchers showed that a positive attitude in patients was able to reduce the risk of developing coronary artery disease at 10-year follow-up (RR 0.78; 95% CI 0.63–0.96; p = 0.02).

CONCLUSION

Our review of the literature indicates that the problem of prevention and physical rehabilitation in older age groups is very relevant for healthcare and society as a whole. Conducting rehabilitation programs for this category of patients is a complex medical and organizational task. This is due to a low functional reserve, the presence of comorbid diseases, conditions inherent in elderly people (sarcopenia, intellectual and mental disorders), as well as often social maladjustment of patients.

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