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Role of exercises in reducing hypertension in young primary hypertensives

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Ключові слова: артеріальна гіпертензія, діти, підлітки, фізична реабілітація.

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Key words: hypertension, physical exercises, children, young adults.

Наведено огляд даних спеціальної літератури про немедикаментозне лікування дітей і підлітків з первинною артеріальною гіпертензією, а також власну оригінальну програму досліджень можливості фізичної реабілітації хворих.

Приведены обзор данных специальной литературы о немедикаментозном лечении детей и подростков с первичной артериальной гипертензией, а также собственная оригинальная программа исследований возможности физической реабилитации больных.

The review provides a general overview of hypertension management with exercises aspects that are specific to children and adolescents. The original program focused on physical rehabilitation of hypertensive patients also is done.

In this review we provide a general overview of hypertension management with exercises aspects that are specific to children and adolescents.

Introduction

The incidence of high blood pressure (hypertension) in children has risen significantly over the past 2 decades. The increase is thought to be linked to increases in body weight, diets high in fat and cholesterol, and sedentary lifestyles [14]. Although hypertension (HTN) affects only 1% to 3% of the pediatric population, immediate and long-term health consequences are possible. Even young children and adolescents with borderline or untreated hypertension have evidence of left ventricular hypertrophy and beginning changes of atherosclerosis [15]. Hypertensive children and adolescents are frequently arbitrarily excluded from sports or exercise because of the fear of possible complications, such as stroke or myocardial infarction. No hypertensive children have had exercise-related morbidity or mortality in the reviewed literature. No restriction from dynamic exercise seems warranted; training has led to reductions in blood pressure in hypertensive youth [16]. Regimens of dynamic exercise have been shown to normalize blood pressure [1,2]. Long term aerobic exercise regimens have in most studies had a beneficial effect on systemic blood pressure and may reduce the incidence of hypertension. During aerobic exercise there is an appropriate elevation in BP, primarily systolic [9]. It is interesting to note that, in addition to voluntary exercise, spontaneous physical activity is another potentially important source (100 to 800 kcal/day) of energy expenditure [9]. Isometric exercise is believed to increase the risk for adult primary hypertensives; where as in young primary hypertensives the incidence of CAD is very low, therefore isometric exercise does not pose a risk [4]. However heavy exercise is not without risk, it can induce cardiac arrest or acute myocardial infarction, particularly in previously sedentary subjects [3]. Thus a regular exercise regimen should gradually increase in intensity over time; sudden vigorous exertion should be avoided.

Methods

On the basis of supervision of group of teenagers in the age of 17–18 years (students of the first rate of Zaporozhye state medical university, Ukraine) it is developed method of non medicamentous treatment of a primary arterial hypertension and pre-hypertensive conditions. The essence of work is based on the clinical hypothesis that training process in the form of cyclic dynamic exercises in an aerobic mode (employment on a bicycle imitator) of average or high intensity promotes long-term effect to decrease systemic peripheral resistance of arteries. Hence it is capable to reduce arterial pressure. In teenagers we spend primary screening to groups of supervision in kind of 3 measurements of arterial pressure in standard conditions with an interval in 7-10 days. The persons having high normal figures of arterial pressure and with an arterial hypertension pass then clinical inspection which includes daily monitoring of arterial pressure, rheographic researches, ultrasound cardioscopy, electrocardiography, survey of an eye bottom and other necessary researches excluding symptomatic hypertension. Patients with advanced arterial hypertension and LVH are excluded from research because they must obtain drug treatment. Our researches have shown a high degree of conformity of results of screening to data of daily monitoring of arterial pressure. The second investigation phase is studying physical working capacity of patients and results functional tests during purpose of trial physical activities. On this basis by the expert on medical rehabilitation it is planned long-term (6–9 months) training process (3-rd stage). Comparative supervisions mean researches of groups of teenagers with a primary arterial hypertension and conditionally healthy persons who are participating or not participated in trainings with their as much as possible full randomization to other attributes. The program includes dynamic supervision and volunteer's natural history in 1,3 and 5 years.

Discussion and conclusions

Though the exact mechanism for lowering blood pressure with dynamic exercise is incompletely understood it has

been suggested that several months of dynamic exercising produces a relatively hypokinetic circulatory state which is probably due to the negative inotropic effect of reduction in heart rate and adaptations in the neuroendocrine system which results in increased vagal tone and decreased release of norepinephrine and epinephrine. There are numerous proposed mechanisms for salutary effect of exercise in BP including neurohumoral, vascular, and structural adaptations, decrease in catecholamines, TPR, and body weight and fat stores, as well as improved insulin sensitivity and alterations in vasodilatation. They are postulated to explain the

antihypertensive effects of exercises [5,6,7]. Considerable evidence suggests changes in vascular structure occur in muscles in response to exercise training. These include positive vascular remodeling [8]. The cross sectional data indicate endurance trained subjects have larger arterial lumen diameter in conduit arteries than untrained controls [10,11,12]. A recent longitudinal study confirmed these findings. Moreover, intima-media thickness and intima-media thickness/lumen ratio were reduced [13]. Although definitive conclusions regarding the mechanisms for BP reductions after endurance exercise cannot be made at this time.

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