Type of exercise and vascular remodelling

Dear editor,

I read with great interest the recently published study by Galetta et al. [1]. They compared LV diastolic function and carotid artery remodelling in elderly athletes and sedentary controls. They concluded that pulsed tissue Doppler imaging may play an important role in detecting training-induced LV and carotid artery structural and functional modifications.

Cardiovascular adaptations in athletes are dependent multifactorial parameters (genetic, age, type of exercise, exercise duration). However, it is accepted that type of exercise is key role for cardiac remodelling to regularly and intensive exercise training. The review on this topic confirmed how endurance- and strength-training may determine either extreme volume or pressure load, thus causing the ventricular cavity diameters and wall thickness with different degree [2]. Great vascular adaptation to habitual exercise also shows variability and affects left ventricular remodelling in two different exercise types, static or dynamic. According to our reports, aortic distensibility was increased and associated with maximal oxygen consumption in endurance athletes [3]; however, it was decreased in strength-trained athletes [4].

Recently, an easily measured tissue Doppler index was proposed as a potentially useful method for differentiating physiological variants from structural heart disease [5]. What is more, in both types of exercise, diastolic functions of LV in athletes are better than those of sedentary subjects. In the same way, we also found that multivariate analyses showed a strong correlation between aortic distensibility and LV diastolic functions (measured by standard and tissue Doppler echocardiography) [6]. In keeping with perfect diastolic function, these vascular changes may be a physiologically cardiovascular adaptation to habitual exercise.

Structural changes (changes of elastin and collagen density and turnover) are believed to play a major role in the age-associated decline in large artery compliance [7,8]. The contractile state of the VSM cells also influences large artery compliance. An increase in VSM cell tone likely contributes to the decrease in compliance with age [7,8].

Large artery compliance affects several physiologically significant effects on cardiac function and structure ventricular–vascular coupling at rest, including aortic impedance and LV wall tension, LV hypertrophy, work/oxygen demand, cause to change of myocardial contraction, and early diastolic filling rate [9].

With regard to structural adaptations, endurance exercise training is associated with increased total elastin content and reduced calcium content of elastin and collagen cross-linking in rat aortae [10]. These data suggest that a partial reversal of age-associated changes in the two primary structural elements of the arterial wall may contribute to the beneficial effects of endurance exercise training on large artery compliance.

Finally, although the effectivity of regular exercise on age-associated cardiovascular alterations has not been completely demonstrated, I agree with the author’s conclusion that the regular exercise training may prevent to more deterioration of vascular structure and LV function depending on age.

References


Erdem Kasikcioglu M.D., Ph.D. *
Sports Medicine Department, Istanbul University, No = 2/5, Avciar, 34840 Istanbul, Turkey
E-mail address: ekasikcioglu@yahoo.com (E. Kasikcioglu M.D.).

Received 17 November 2004
Available online 07 July 2005

* Tel./fax: +90 216 340 5316.

0753-3322/$ - see front matter © 2005 Elsevier SAS. All rights reserved.
doi:10.1016/j.biopha.2005.06.003