Athletes Heart Structural and Functional Condition Monitoring

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Objectives. Echocardiography allows to diagnostic cardiac enlargement, and to estimate the heart functional capacity. An aim of our investigation was to estimate the heart structural and functional characteristics of basketball players and winter biathlon skiers.

Methods. Fifteen 17-18 years old Latvian elite male basketball players and twenty 16-35 years old elite winter biathlon skiers participated in the investigation. The structural cardiac adaptation is estimated by echocardiography. The heart functional adaptation to the endurance training is determined on a cycle ergometer. The intensity of exercises increased step by step from 0,5 to 2 W per kg of the body mass, the exercises intensity and heart rate relationship is determined.

Results. Echocardiography characteristics in the basketball players and winter biathlon skiers did not exceed the upper limits for male athletes [1]. The left ventricular wall thickness was below 12 mm in all basketball players. It exceeded 12 mm in two winter biathlon skiers, but was thinner than 14 mm in all athletes. The left ventricular end diastolic cavity size was larger than 55 mm in five basketball players and six experienced biathlon skiers. It did not exceed 66 mm in all athletes. The average left ventricular end diastolic volume was 141,3 ± 13,5 cm³ in winter biathlon skiers and 172,4 ± 32,0 cm³ in basketball players. The average stroke volume was 91,3 ± 13,5 cm³ in biathlon skiers and 76,7 ± 15,7 cm³ in the basketball players.

Basketball players had higher heart rate values than athletes trained in winter biathlon during the same intensity exercises performed on the cycle ergometer. The heart rate increase with growth of the intensity of exercises in basketball players was faster than in athletes trained in biathlon.

Conclusions. The largest heart stroke volumes are observed in athletes trained in winter biathlon many years. The basketball players had larger left ventricular volume in the end of diastole. Nevertheless their stroke volume was smaller in comparison with athletes trained in winter biathlon.

The heart rate values were higher in the basketball players in comparison with the athletes trained in winter biathlon during the same intensity exercises. The data confirm better heart structural and functional adaptation in winter biathlon skiers to endurance exercises than in young basketball players.


Keywords: Endurance Performance, Hemodynamics