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Atrial function and loading conditions in athletes

Flavio D'Ascenzi

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Author

Flavio D'Ascenzi

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Abstract

Intensive training is associated with hemodynamic changes that typically induce an enlargement of cardiac chamber. Despite LA dilatation in athletes has been interpreted as a benign adaptation, little evidence is available. The aim of this thesis is to demonstrate that LA size changes in response to alterations in loading conditions and to analyse atrial myocardial function in athletes through the application of novel echocardiographic techniques.

We found that top-level athletes exhibit a dynamic morphological and functional LA remodelling, induced by training, with an increase in reservoir and conduit volumes, but stable active volume. Training causes an increase in biatrial volumes which is accompanied by normal filling pressures and stiffness. These changes in atrial morphology are not associated with respective electrical changes. Extending the evidence from adult athletes to children, we found that training-induced atrial remodelling can occur in the early phases of the sports career and is associated with a preserved biatrial function. Finally, in a meta-analysis study of the available evidence we demonstrated that atrial function and size are not affected by aging.

In conclusions, athlete's heart is characterized by a physiological biatrial enlargement. This adaptation occurs in close association with LV cavity enlargement, is dynamic and reversible. This increase in biatrial size is not intrinsically an expression of atrial dysfunction. Indeed, in athletes the atria are characterized by a preserved reservoir function, normal myocardial stiffness, and dynamic changes in response to different loading conditions.

Keywords

Athlete's heart, training, exercise, speckle-tracking echocardiography, atrial strain, atrial deformation.

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