

BY HAJNALKA VÁGÓ

Athletes' normal left ventricular magnetic resonance parameters modify trabeculae measurement

Hearing loss can present many difficulties and obstacles to sufferers, and with ageing populations it's set to become a major healthcare challenge. Many conditions such as congenital malformation of the inner ear or hypoplastic cochlear nerve can also lead to hearing loss, and sometimes deafness.

DIAGNOSTIC CHALLENGE

As we are all aware, top athletes are three to five times more at risk of sudden cardiac death than the general population. We also know that regular and intensive physical training leads to physiological cardiac hypertrophy, or remodelling, the so called 'athlete's heart.' However, sometimes in our daily routine we face the diagnostic challenge of differentiating between normal cardiac adaptation and pathological forms (e.g. hypertrophic cardiomyopathy, left ventricular non-compaction, etc.) These conditions can serve as an arrhythmogenic substrate.

POWER OF CARDIAC MAGNETIC RESONANCE (CMR)

CMR is a reference method for determining several cardiac parameters: left and right ventricular volumes, ejection fractions and masses. It's a highly useful way to

do follow-up in athletes because of its low intra-observer and inter-observer variability. This is very important because of the progressive nature of the cardiomyopathies. However, there is only a small amount of data available concerning normal CMR values for top athletes. As I have already mentioned, we have performed CMR scans for more than 100 athletes in the last eight years. All these athletes were professionals, most of them members of an Olympic or other international team. We also carried out CMR examinations in healthy age-matched and gender-matched volunteers.

TRABECULATIONS

Anatomical structures such as the papillary muscles and subendocardial trabeculations represent a small part of the myocardium. However, we should decide during image analysis whether these structures belong to the myocardium or are part of the ventricular cavity. Thanks to a new software update it is now possible to quantify the trabeculations of the ventricles as well (Figure 1, abbreviations: LVESV: left ventricular end-systolic volume, LVEDV: left ventricular end-diastolic volume, LVSV: left ventricular stroke volume, LVM: left ventricular mass, LVEF: left

ventricular ejection fraction). This enables us to redefine what we mean by normal cardiac CMR values.

Using this new software option we could detect the volume and mass changes and differences between the athletes and the control group. We found that left ventricular mass was higher when measured with the new software option and the volumes were lower. Moreover, the athletes had higher trabecular mass compared to healthy volunteers but the percentage of the left ventricular mass was lower. What might be the reason behind this? The explanation could be that in the case of athletes, hypertrophy in the compact myocardium is more pronounced compared to the trabeculae mass.

I think with the help of this post-processing technique we can have more precise knowledge of physiological and pathological hypertrophy, and I am sure that in the near future the results could modify the normal reference values used in the daily clinical routine as well.

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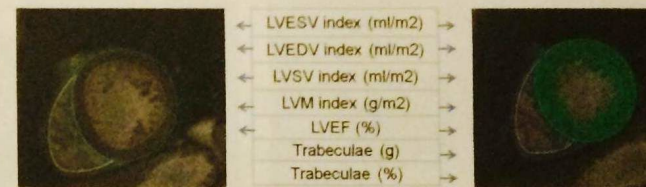


Figure 1: Trabeculations of the ventricles. Abbreviations: LVESV: left ventricular end-systolic volume, LVEDV: left ventricular end-diastolic volume, LVSV: left ventricular stroke volume, LVM: left ventricular mass, LVEF: left ventricular ejection fraction. (Provided by Hajnalka Vágó)

Scientific Session: Cardiac

Sunday, March 8, 10:30–12:00, Studio 2015 #ECR2015Studio #SS1803
SS 1803 Biomarkers in cardiac imaging

Moderators: A. Kallifatidis, Thessaloniki/GR

T. Leiner, Utrecht/NL

» Athletes' normal left ventricular magnetic resonance parameters modified by trabeculae measurement
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