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Editorial

Cardiac Magnetic Resonance in the Aging Heart

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▸ See the article "What is Normal for an Aging Heart?: A Prospective CMR Cohort Study" in volume 30 on page 202.

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Cardiac magnetic resonance (CMR) enables comprehensive evaluation of the cardiac structure, function, perfusion, blood flow quantitation, and tissue characterization.[1] As the lifespan of people increases, the elderly population is growing. Therefore, it is critical to determine the physiologic change and reference values of CMR parameters according to age to discriminate between normal subjects and patients.

Researchers have conducted studies to determine reference CMR values according to age.[2-6] The Multi-Ethnic Study of Atherosclerosis (MESA) study, a large population study, suggested that concentric remodeling occurs with aging; the ventricular volume decreases while left ventricular (LV) mass remains constant or decreases slightly, increasing the LV mass-to-volume ratio. However, ejection fraction remained normal even with advancing age.[3]

In this issue of the *Journal of Cardiovascular Imaging*, Kersten et al.[7] comprehensively evaluated ventricular function, native T1 and T2 values of the myocardium, aortic distensibility, and deformation parameters using CMR in 75 healthy subjects and 10 otherwise healthy diabetics. Despite the small sample size, the authors applied relatively strict inclusion criteria to reduce potential confounding factors. With aging, the biventricular volumes decreased while the ejection fraction remained normal, confirming the previous results.[3][4] Similar to the prior studies,[2][6] a decrease in aortic distensibility and LV peak diastolic strain rates were observed with aging. Interestingly, the myocardial native T1 value decreased with aging in this study. T1 mapping revealed a strong correlation with diffuse myocardial fibrosis on endomyocardial biopsy.[8][9] Age-related cardiac remodeling is known to accompany diffuse interstitial fibrosis.[5][10] However, previous studies have reported different results for relationships between aging and native T1 value.[5][11][12] The differences may result from the different inclusion criteria and age-dependence of T1 indices according to sex.[5][11] Type 2 diabetes patients showed lower end-diastolic volume index and stroke volume index, but there was no difference in ejection fraction or LV mass in this study. This result is different from the MESA study that reported diabetes was associated with higher LV mass and lower stroke volume and ejection fraction.[13] However, only 10 patients were included in this study and the duration since the diagnosis of diabetes was not analyzed. Although the authors applied strict inclusion criteria, the significance of the results seems limited because of the small sample size. Further studies with a larger population are necessary to confirm the results.

CMR enables quantification of morphological and functional parameters, and tissue characterization. It helps better understand cardiac aging and identify physiologic changes with age. With the development of various techniques of CMR, further research on the aging heart needs to be updated.

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