Morphological Characteristics in Atrial Functional Mitral Regurgitation in Patients with Atrial Fibrillation

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Introduction: Recently, it has been increasingly recognized that lone atrial fibrillation can cause atrial functional mitral regurgitation (AFMR). However, the pathogenesis of AFMR are poorly understood. The aim of this study was to clarify the morphological characteristics in patients with AFMR.

Methods: Among consecutive 795 patients undergoing initial radiofrequency catheter ablation (RFCA) at our hospital, twenty-five patients with persistent AF accompanied by AFMR (≥ moderate) before RFCA (AFMR group) were studied. Age-matched 25 patients with persistent AF without MR were defined as a control group.

Result: Transthoracic echocardiography showed that left ventricular ejection fraction (LVEF) was lower and left atrium volume index was larger in the AFMR group (Table). Mitral valve annulus diameter and length of anterior mitral leaflet (AML) were similar between groups, whereas length of posterior mitral leaflet (PML) was significantly shorter in the AFMR group. Smaller tethering angle of AML (γ in the figure) and shorter tethering height were significantly associated with the occurrence of AFMR, which were different from morphology of functional mitral regurgitation in patients with dilated LV. Multiple regression analysis revealed that less tenting height (p<0.05) and LA dilatation toward the posterior (p<0.01) were significantly related to AFMR.

Conclusion: AFMR has unique morphological features, such as less tethering height and LA dilatation toward the posterior, which may be mechanistically different from functional MR from LV dilatation.