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Editorial

Prognostic Value of Left Atrial Volume in Patients with Progressive Mitral Stenosis: A Possible Analogy with Left Ventricular Mass in the Setting of Pressure Overload

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▸ See the article "Prognostic Implications of the Left Atrial Volume Index in Patients with Progressive Mitral Stenosis" in volume 27 on page 122.

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The importance of left ventricular (LV) geometric pattern is widely recognized as an important determinant of cardiovascular risk.[1)2)] It is not surprising that LV geometric pattern has a prognostic value in predicting cardiovascular events in a wide spectrum of patients, particularly given that altered LV geometry may be a time-integrated indicator of chronic pressure and/or volume overload on the LV.[3)] It is conceivable that a similar process may occur in the left atrium (LA) when the LA undergoes pressure overload. One difference in changes in the LA undergoing pressure overload in comparison with those in the LV is that it is difficult to observe a prominent thickening of the LA wall, although cellular hypertrophy is present in response to elevated afterload.[4)] Since the LA usually enlarge when conditions of pressure and/or volume overload, echocardiographic measures of LV volume have been investigated extensively with regard to their association with diastolic function,[5)] and prognostic significance in various cardiovascular disease, such as hypertension, heart failure, atrial fibrillation, and myocardial infarction.[6)7)]

In this issue of the Journal of Cardiovascular Imaging, Cho et al.[8)] report on the prognostic value of LA volume index (LAVI) in patients with pure progressive mitral stenosis (MS), a representative disease resulting in pressure overload to the LA. In this retrospective study, 259 patients diagnosed with rheumatic progressive MS were followed up for a median of 52 months during which 41 (18.3%) composite endpoints occurred, consisting of 3 (1.3%) cardiovascular deaths, 8 (3.6%) hospitalization due to heart failure, 12 (5.3%) mitral valve replacements, 2 (0.9%) percutaneous mitral valvuloplasty (PMV), and 16 (7.1%) ischemic strokes. This is an important study with careful follow-up and with comprehensive echocardiographic evaluation. The main finding of the study is that patients with a larger LA (LAVI > 50 mL/m^2) demonstrated poor event-free survival compared with those with a small LA (LAVI ≤ 50 mL/m^2) in the study population, and this prognostic value of LAVI was similar in asymptomatic patients. These results support the utility of LAVI as an imaging biomarker that is reflective of chronicity and severity of LA pressure overload and thus associated with adverse clinical outcomes. A second important finding is that LV mass index, mitral valve area (MVA), and mean diastolic pressure as well as atrial fibrillation were the factors independently associated with LAVI in patients with progressive MS. Considering that the smaller MVA and greater LV mass index lead to higher diastolic pressure gradient, these

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findings reinforce the notion that adverse LA remodeling, such as LA enlargement, reflects atrial response to pressure overload integrated over time.

However, more data are clearly required in larger populations to determine whether LAVI can be applied clinically in the management of patients with progressive MS. Furthermore, one of the next steps will be to explore whether the assessment of LAVI can provide useful information in guiding management strategy in patients with progressive MS of MVA between 1.5 and 2.0 cm^2. For example, if a patient with huge LA and without atrial fibrillation is diagnosed as having MVA between 1.5 and 2.0 cm^2, should we consider reassessment of MS severity, on the basis of the hypothesis that LAVI, a time-integrated indicator of chronic pressure overload on the LA, may more accurately reflect MS severity than other parameters which are substantially affected by transient hemodynamic changes? On the other hand, the assessment of LAVI can be incorporated into decision making when treating MS patients with symptoms not explained by another cause, with MVA greater than 1.5 cm^2, and with favorable valvular anatomy to PMV, if further studies confirm that LAVI has comparable diagnostic and prognostic utility when compared to established parameters in detecting hemodynamically significant MS, such as pulmonary artery wedge pressure greater than 25 mmHg or mean mitral valve gradient greater than 15 mmHg during exercise.[9)10)]

The findings of Cho et al.[8)] should prompt more tailored studies to examine the association between LAVI and each of the clinical outcomes, such as cardiovascular death, percutaneous mitral valve intervention and surgery, hospitalization due to heart failure, and stroke, in patients with progressive MS, and its mechanisms, in analogy with the prognostic value of LV mass index on which many studies have been carried out. Furthermore, whether the follow-up and treatment strategy should be tailored according to the LAVI in patients with progressive MS remains to be addressed in properly designed prospective clinical trials.

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