Atrial coupling index by standard echocardiography in degenerative mitral regurgitation: incremental determinant of survival

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Topic(s):
Echocardiography: Valve Disease

Background: Left atrial (LA) volume is linked to outcome in degenerative mitral regurgitation (DMR) but does not encompass LA function assessment. Thus, we ought to determine the prognostic role of left atrial coupling-index (LACI), as left atrial volume-index (LAVI) by Tissue-Doppler-Imaging a' (TDI-a'), in a large cohort of DMR.

Methods: All consecutive 4792 patients (61±16 years, 48% women) with isolated degenerative mitral valve disease diagnosed at Mayo Clinic 2003-2011, comprehensively characterized, in whom LAVI and TDI-a' in sinus rhythm was prospectively measured in routine practice, was enrolled and their long-term survival analyzed.

Results: LACI (5.8±3.7--T1<3.8; T2 3.8-6.3; T3>6.3) was significantly higher through different DMR grades (no, mild, moderate, severe DMR: 3.77±2.26, 5.08±2.95, 6.54±3.74 and 7.84 ±4.29 respectively; p<0.0001). Independent determinants of LA dysfunction assessed by LACI were age, E/e', left-ventricle (LV) end-systolic-diameter, mitral-regurgitation (MR) grade, and LV ejection-fraction (all P≤0.0001). LACI>6 was independently associated with dyspnea, edema, more severe functional tricuspid-regurgitation and elevated pulmonary artery pressure, irrespective of age, sex, Charlson-comorbidity-index, ventricular function and MR severity. Total follow-up was 7.03±3.0 years, during which 1146 (24%) underwent mitral-valve surgery (94% repair-6% replacement) and 880 (18%) died, 780 under medical treatment and 100 after surgery. Overall survival throughout follow-up (10-year 76±1%) was strongly associated with LACI (88±1% vs. 78±1% and 62±2% for LACI <3.8, 3.8-6.3 and ≥6.3, P<0.0001) even adjusting comprehensively, including for DMR severity (adjusted-hazard-ratio 1.23[1.07-1.43] for LACI>5.79, P=0.005). Mortality under medical management was profoundly affected by LACI (adjusted-hazard-ratio 1.11[1.05-1.18] per 3 unit increment; 1.35[1.15-1.58] for LACI>5.79 vs. ≤5.79, both P=0.0002). Survival improved after mitral surgery (time-dependent adjusted-hazard-ratio 0.40[0.28-0.65], P<0.0001) but remained humbly linked to LACI (10-year 93±3% vs. 90±2% and 80±3% for LACI tertiles, P=0.0008). Most importantly, LACI provided incremental prognostic information over LAVI and other conventional determinants of survival (P<0.0001) with Net-reclassification-improvement vs. LAVI of 0.21±0.02, P<0.0001.

Conclusion: LA function assessed by LACI in routine practice, by conventional echocardiographic measurements, displays incremental and independent link to excess-mortality, considerable under medical management and partially alleviated by mitral surgery. Thus, LACI is a simple tool of crucial interest in DMR risk-stratification.
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