A single factor related to left atrial pressure overload is useful for prognosis in elderly patients with heart failure with preserved ejection fraction: PURSUIT HFpEF study

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Background: E/e' and the ratio of diastolic elastance (Ed)/arterial elastance (Ea) = (E/e')/(0.9 × systolic blood pressure), indices of left atrial (LA) pressure overload, are elevated in elderly women with heart failure with preserved ejection fraction (HFpEF). The severity of diastolic dysfunction is assessed by a combination of several indices of LA volume and pressure overload. However, which overload is more important as a single factor for the prognosis of these patients remains undefined.

Methods: We enrolled patients with HFpEF showing sinus rhythm (n=145; left ventricular ejection fraction >50%; men/women, 56/89; mean age, 80.5 years). Blood examination and transthoracic echocardiography were performed before discharge. All-cause mortality and admission for cardiac events were evaluated after more than 1 year (mean, 370 days).

Results: The all-cause mortality rate was 11% (16/145). There were significant differences in age (p=0.005), serum N-terminal pro-brain natriuretic peptide (NT-proBNP) level (p<0.001), LA volume index (p=0.018), E/e' (p=0.022), and Ed/Ea (p=0.016) between patients with and without all-cause mortality. When cutoff points for mortality by receiver operating characteristic curve analysis were examined, the area under the curve in LA volume index (0.564) was slightly smaller than that in age (0.734), NT-proBNP level (0.732), E/e' (0.695), and Ed/Ea (0.709). Kaplan-Meier survival analysis clearly showed that age >85 years (p<0.001), NT-proBNP level >888 pg/mL (p=0.003), E/e' >14.4 (p=0.02), and Ed/Ea >0.153 (p<0.001) were determinant factors for mortality. Cox hazard ratios were also significant in these indices (p=0.002, p=0.012, p=0.028, and p=0.001, respectively). In the case of all-cause mortality or admission for cardiac events, the results were nearly similar as those in the case of all-cause mortality. Ed/Ea exhibited a larger Cox hazard ratio for prognosis than E/e’ in the multivariate analysis.

Conclusions: LA pressure overload compared to volume overload was a useful marker for prognosis in elderly patients with HFpEF. As a single index for LA pressure overload in noninvasive echocardiographic findings, Ed/Ea may be more suitable than E/e'.