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The prognostic impact of a concentric left ventricular structure evaluated by transthoracic echocardiography in patients with acute decompensated heart failure: A retrospective study

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Highlights

- Relative wall thickness is the index of left ventricular concentricity.
- Mass to volume is also the index of left ventricular concentricity.
- Those indexes are measured by transthoracic echocardiography.
- High relative wall thickness had poor survival in patients with acute heart failure.
- Mass to volume of left ventricular had no prognostic value in acute heart failure.

Abstract

Background

Left ventricular (LV) wall thickening relative to the LV radius, known as a concentric LV structure, is a mechanism that compensates for pressure overload and is related to the risk of cardiovascular events and heart failure. The prognostic value of a concentric LV structure, however, has not been examined in acute decompensated heart failure (ADHF).

Methods

This single-center, observational, retrospective, cohort study analyzed 385 consecutive patients hospitalized due to ADHF. On hospital admission, relative wall thickness (RWT) and the ratio of LV mass to LV end-diastolic volume (LVM/LVEDV) were measured by transthoracic echocardiography as markers of a concentric LV structure. The association of either RWT or LVM/LVEDV with all-cause death as the primary outcome was analyzed.

Results

During the follow-up period (median, 235 days), 95 (25%) patients died. The high-RWT group had a poorer prognosis than the low-RWT group (log-rank test, $P = 0.009$). High RWT was a significant risk (HR: 1.95, 95% CI: 1.28–2.97, $P = 0.002$) in the Cox proportional hazard model analysis adjusted by the Get With The Guideline score, which is an established risk score. In contrast, there was no significant difference in survival between the low and high-LVM/LVEDV groups ($P = 0.42$). In the non-severe valvular disease subgroup, patients with high RWT consistently showed worse survival than the low-RWT group ($P = 0.028$ by log-rank test, HR: 1.96, 95% CI: 1.24–3.11, $P = 0.004$). There was no significant difference in survival between the low and high-LVM/LVEDV groups ($P = 0.42$).

Conclusions

A concentric LV structure represented by a high RWT was associated with a poor prognosis in ADHF. The lack of association between LVM/LVEDV and mortality may result from methodological issues.