

Clinical significance of the relative apical sparing pattern of longitudinal strain in patients with cardiac amyloidosis

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Background: The relative apical sparing pattern (RASP) of left ventricular (LV) longitudinal strain (LS) is frequently associated with cardiac amyloidosis (CA). However, some patients with CA do not show the RASP, and their clinical characteristics have not been fully clarified. We sought to investigate the clinical significance of RASP in patients with CA.

Methods: One hundred consecutive CA patients who were diagnosed by biopsy or myocardial pyrophosphate scintigraphy and evaluated for RASP (mean age: 76 years, male: 77%, LV mean wall thickness: 13.5 mm, light-chain [AL] type: 33 cases, transthyretin [TTR] type: 67 cases) were retrospectively enrolled. The RASP was semi-quantitatively and quantitatively assessed. Semi-quantitative RASP was defined as reduction of LS ($\geq -10\%$) in ≥ 5 (of 6) basal segments relative to preserved LS ($< -15\%$) in ≥ 1 apical segment. Quantitative RASP was calculated according to the following formula: Quantitative RASP = [Average apical LS] / [Average basal LS + Average mid LS]. We adapted three validated thresholds (>1.00 , >0.90 , and >0.87) according to the literature.

Results: Semi-quantitative and binalized quantitative RASP (>1.00 , >0.90 , and >0.87) were observed in 55, 55, 63, and 65 patients, respectively. RASP in each definition was more prevalent in the TTR group than in the AL group. Additionally, RASP was significantly associated with higher LV wall thickness even after adjustment for the CA subtypes (all, $p < 0.05$, Figure). After the RASP assessment, 35 all-cause deaths and 26 cardiac deaths were observed during the follow-up period (median, 1.1 years). Although these events were significantly associated with poor nutrition, lower blood pressure, higher New York Heart Association class, and the AL group, no association was found with RASP and LV wall thickness.

Conclusions: The incidence of RASP is low in the case of thin LV wall thickness in CA patients, which may indicate the difficulty of early diagnosis of CA using RASP in patients with mild LV hypertrophy. The prognostic prediction using RASP may be challenging in this cohort.

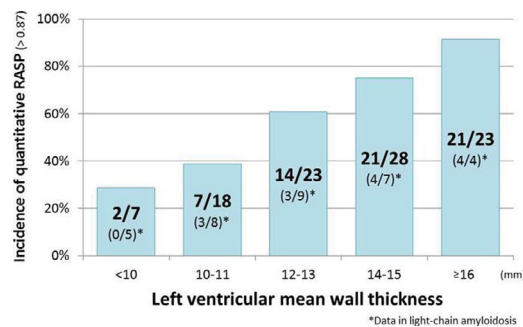


Figure 1