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Quantitative assessment of right atrial function by strain and strain rate imaging in patients with heart failure.

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Abstract

OBJECTIVES: We sought to evaluate the regional longitudinal strain/strain rate profiles in the right atrial wall to quantify right atrial function in systolic heart failure patients.

BACKGROUND: According to previous studies on the deformational properties of the left atrium, the systolic strain and strain rates represent the atrial reservoir function and the early and late diastolic strain rates show the conduit and booster functions, respectively.

METHODS: Thirty patients with a diagnosis of heart failure (left ventricular ejection fraction < or = 35%) scheduled for right heart catheterization were enrolled. Echocardiography was performed to obtain right atrial deformation indices just before the procedure. The control group consisted of 32 healthy adults matched for age and sex. The deformity indices obtained consisted of the right atrial peak systolic strain (RAS), right atrial peak systolic strain rate (RASSR), right atrial early diastolic strain rate (RAEDSR), and right atrial late diastolic strain rate (RALDSR).

RESULTS: The right atrial deformation indices were significantly compromised in the heart failure patients versus the normal subjects (RAS: 68.5 +/- 53.9 vs 189.3 +/- 61.2, P = 0.000; RASSR: 2.9 +/- 1.9 vs. 5.3 +/- 1.5, P = 0.000).There was a significant correlation between the RAS and RASSR and cardiac output (RAS: r = 0.5, P = 0.005; RASSR: r = 0.5, P = 0.003), and cardiac index (RAS: r = 0.6, P = 0.001; RASSR: r = 0.6, P = 0.001).

CONCLUSION: In light of our findings, we conclude that a diminished RA function, as assessed by strain imaging, plays a critical role in the pathophysiological process of heart failure patients.

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