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Mechanical dispersion of the right atrium in dilated cardiomyopathy: does the etiology matter?

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Background:

Mechanical dispersion assessed by myocardial strain reflects a susceptibility for arrhythmia development. While the contractile heterogeneity of both ventricles has been assessed in different clinical settings, the incidence and significance of right atrial (RA) dyssynchrony in dilated cardiomyopathy (DCM) are unknown.

Methods: 50 consecutive patients with DCM were divided in 2 groups according to the etiology: group I had 26 patients with ischemic DCM (68 ± 10 years, 23 men), group N had 24 patients with non-ischemic DCM (52 ± 12 years, 18 men). We assessed the RA strain by 2D speckle-tracking analysis, and we calculated RA mechanical dispersion as the standard deviation of the time-to-peak contraction strain in 6 RA segments. 20 healthy individuals served as controls. Data were compared between groups with one-way analysis of variance and using a post-hoc Bonferroni correction.

Results: The RA strain was reduced in DCM patients, both in group I and in group N. All three components of the RA strain were most reduced in group I ($p < 0.001$ for reservoir and conduit strain, $p = 0.001$ for contraction strain) (Table). The RA mechanical dispersion was highest in group I (56.8 ± 21.6 ms), followed by group N (39.9 ± 15.3 ms) and controls (23.8 ± 7.7 ms)($p < 0.001$). Patients with DCM and documented supraventricular arrhythmias (either atrial fibrillation, atrial flutter or premature atrial contractions) had higher RA mechanical dispersion (57.5 ± 19.7 ms) than DCM patients with no documented atrial rhythm disturbances (44.9 ± 19.9 ms, $p = 0.04$).

Conclusion: Mechanical dispersion of the RA is pronounced in patients with DCM and it is higher in patients with documented supraventricular arrhythmias. Patients with ischemic DCM have a more pronounced mechanical dispersion of the RA than patients with non-ischemic DCM, reflecting a more heterogenous RA contraction in ischemic heart disease when compared to other forms of DCM. The prognostic significance of RA dyssynchrony in a disease primarily involving the left heart warrants further studies.

	Group I	Group N	Controls	P value
Reservoir RA strain (%)	12.9 ± 7.4§	17.6 ± 12.9§	30.1 ± 9.9	<0.001
Conduit RA strain (%)	-6 ± 5.5§	-8 ± 8.9§	-15.2 ± 6.4	<0.001
Contraction RA strain (%)	6.9 ± 6§	9.6 ± 8.1	14.9 ± 6.1	0.001
RA mechanical dispersion (ms)	56.8 ± 21.6§	39.±15.3§*	23.8 ± 7.7	<0.001
§ significant difference with controls; * significant difference with group I				