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Left atrial strain: a potential marker of early diastolic dysfunction in patients with Marfan syndrome

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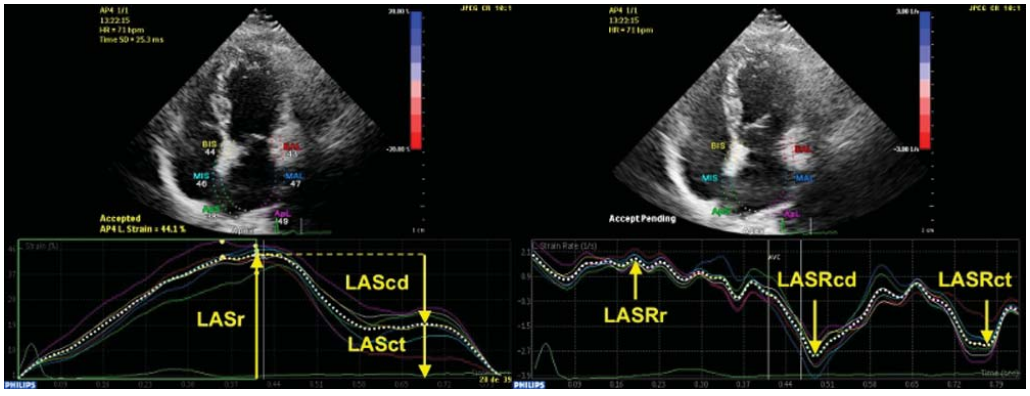
Background/Introduction: Previous studies using conventional echocardiographic measurements have reported subclinical left diastolic dysfunction in patients with Marfan syndrome (MFS). Left atrial strain (LAS) has been shown to be an accurate predictor of left ventricular diastolic dysfunction. However, there is no evidence regarding the use of LAS in MFS.
Purpose: To assess feasibility of LAS and compare LAS derived measurements along with traditional diastolic parameters in MFS patients vs healthy controls.
Methods: 46 MFS patients (normal LV ejection fraction, no previous cardiovascular surgery, no significant valvular regurgitation) vs. 20 healthy controls (age and sex-matched). We performed LAS analysis using 2D speckle-tracking (QLAB 10, Philips). LA strain was determined as the average value of the longitudinal deformation (7 segments) in the apical 4-chamber view (RR gating).
Results: LAS analysis was feasible in 40 MFS patients (87%). All participants had normal diastolic function according to current guidelines (ASE/EACVI 2016). MFS patients showed lower TDI e' velocities and higher average E/e' ratio, but still within normal range. Similarly, LVEF was normal but slightly reduced in MFS patients. LA strain and strain rate parameters during reservoir and conduit phase were significantly impaired in MFS patients compared to controls.
Conclusion: MFS patients showed a subtle impairment in diastolic function compared to controls. Although further evidence is needed, LAS derived parameters could be early markers of diastolic dysfunction in this group of patients.

MFS vs controls

	MFS patients (n=40)	Controls (n=20)	p		MFS patients (n=40)	Controls (n=20)	p
Age	33.8±12.4	34.4±8.3	0.846	Septal e' (cm/s)	9.7±2.5	11.7±2.3	0.006
Male (%)	24 (60%)	12 (60%)	1.000	Average E/e' ratio	6.8±1.5	5.5±1.1	0.002
SBP (mmHg)	120.3±12.4	120.1±9.4	0.969	TR velocity (cm/s)	208.6±21.4	201.6±22.9	0.390
DBP (mmHg)	72.0±10.1	67.1±6.2	0.069	LAVi (ml/m^2)	23.5±7.1	25.5±4.8	0.260
Aortic root (mm)	40.3±4.6	31.7±3.7	<0.001	LASr (%)	32.6±8.8	43.0±8.3	<0.001
LVEF (%)	60.9±5.6	64.2±4.2	0.022	LAScd (%)	−20.1±8.0	−29.4±5.5	<0.001
E-wave (cm/s)	74.6±16.5	76.7±16.5	0.651	LASct (%)	−12.8±6.1	−13.6±5.2	0.622
A-wave (cm/s)	55.2±10.9	52.0±12.8	0.327	LASRr	2.02±0.49	2.31±0.43	0.030
E/A ratio	1.4±0.4	1.5±0.4	0.287	LASRcd	−2.22±0.61	−3.07±0.68	<0.001
Lateral e' (cm/s)	13.0±3.6	16.3±3.3	0.002	LASRct	−2.24±0.90	−2.35±0.75	0.600

SBP: Systolic blood pressure. DBP: Diastolic blood pressure. LVEF: Left ventricular ejection fraction. LAVi: Left atrial volume index. LAS: Left atrial strain. LASR: Left atrial strain rate. (r): Reservoir. (cd): Conduit. (ct): Contraction.



Example of LA strain and strain rate