



Figure S1. Kaplan–Meier curves for major adverse cardiac events. The differences in major adverse cardiac events were stratified by SLE related organ damage (measured by SDI > 0) combined with LGE presence (A), locations of LGE (B), and degrees of LGE (C), respectively. Abbreviations: LGE, late gadolinium enhancement; LVFW, left ventricular free-wall; SDI, the Systemic Lupus International Collaborating Clinics/American College of Rheumatology (SLICC/ACR) Damage Index; SLE, systemic lupus erythematosus.

Table S1. Cardiac manifestations and SLE details of patients with SLE.

Variables	Total (N=74)	LGE + (N=39)	LGE - (N=35)	<i>p</i> Value
Cardiac manifestation				
SBP, mmHg	116±13	116±13	116±13	0.802
DBP, mmHg	75±11	77±11	73±12	0.195
HR, beats/min	84±12	85±11	83±14	0.506
Cardiac symptom, n (%)	57 (77)	35 (90)	22 (63)	0.006
Chest pain, n (%)	18 (24)	12 (31)	6 (17)	0.173
Dyspnea, n (%)	37 (50)	24 (62)	13 (37)	0.036
Palpitation, n (%)	14 (19)	7 (18)	7 (20)	0.822
Edema, n (%)	21 (28)	11 (28)	10 (29)	0.972
Arrhythmia, n (%)	21 (28)	14 (36)	7 (20)	0.13
Ventricular arrhythmia, n (%)	10 (14)	5 (13)	5 (14)	0.854
Atrial arrhythmia, n (%)	9 (12)	5 (13)	4 (12)	>0.999
Conduction block, n (%)	3 (4)	2 (5)	1 (3)	>0.999
pericardial effusion, n (%)	36 (49)	20 (51)	16 (46)	0.632
LDL-C, mmol/L, median (IQR)	2.4 (1.9-3.2)	2.52 (2.03-3.34)	2.355 (1.783-2.885)	0.442
SLE detail				
Mucocutaneous manifestations, n (%)	37 (50)	18 (46)	19 (54)	0.485
Musculoskeletal manifestations, n (%)	27 (37)	12 (31)	15 (43)	0.281
NPSLE, n (%)	15 (20)	7 (18)	8 (23)	0.6
Lupus nephritis, n (%)	37 (50)	19 (49)	18 (52)	0.816
Serum C3, g/l, median (IQR)	0.69 (0.35-0.85)	0.705 (0.431-0.952)	0.601 (0.329-0.845)	0.559
Serum C4, g/l, median (IQR)	0.10 (0.03-0.15)	0.098 (0.039-0.147)	0.055 (0.016-0.146)	0.158
CRP, mg/l, median (IQR)	2.9 (1.0-12.7)	3.6 (0.56-12.5)	2.76 (1.02-11.89)	0.733
ESR, mm/h, median (IQR)	31 (14-59)	29 (14-56)	23 (14-62)	0.653
Anti-nuclear antibody, n (%)	70 (95)	36 (93)	34 (97)	0.687
Anti-double-stranded DNA, n (%)	49 (66)	23 (59)	26 (74)	0.164
Anti-Smith antibodies, n (%)	24 (32)	12 (31)	12 (34)	0.747
Anticardiolipin antibody, n (%)	15 (20)	10 (26)	5 (14)	0.225
Anti-β2-glycoprotein 1 antibodies, n (%)	16 (22)	10 (26)	6 (17)	0.375
Lupus anticoagulant, n (%)	22 (30)	13 (33)	9 (26)	0.474
24-hour urine protein, g, median (IQR)	0.2 (0.1-1.0)	0.23 (0.108-1.003)	0.205 (0.118-1.593)	0.726
Serum creatinine, umol/L, median (IQR)	63 (50-83)	64 (50-99)	61 (50-75)	0.279
D-Dimer, mg/L FEU, median (IQR)	1.7 (0.6-3.8)	1.82 (0.49-3.62)	1.66 (0.93-3.99)	0.548

Abbreviations: CRP, C-reactive protein; DBP, diastolic blood pressure; ESR: erythrocyte sedimentation rate; HR, heart rate; IQR, interquartile range; LDL-C, low-density lipoprotein cholesterol; LGE, late gadolinium enhancement; LVFW, left ventricular free-wall; NPSLE: neuropsychiatric lupus; SBP, systolic blood pressure; SLE, systemic lupus erythematosus.

Table S2. Clinical and imaging parameters between SLE patients with and without LVFW LGE.

Variables	LVFW LGE (N=19)	No LVFW LGE (N=55)	<i>p</i> Value
Clinical variables			
Age, years	39±15	33±10	0.094
Female gender, n (%)	18 (95)	52 (95)	>0.999
SLEDAI-2K score, median (IQR)	13 (6-22)	10 (5-18)	0.638
SDI, median (IQR)	2 (0-3)	0 (0-1)	0.024
NT-proBNP, pg/mL, median (IQR)	2699 (835-6779)	643 (186-2592)	0.002
cTnI, ug/L, median (IQR)	0.25 (0.02-0.76)	0.02 (0-0.10)	0.004
Conventional echocardiographic parameter			
IVSD, mm	9.7±1.3	7.9±1.5	<0.001
LVPWD, mm	9.2±1.3	8.1±1.4	0.005
LVEDD, mm	48±7	46±6	0.402
LVESD, mm	33±7	31±6	0.226
LVEF, %	59±11	62±10	0.245
LVFS, %	32±8	34±7	0.204
E/A ratio	1.3±0.5	1.2±0.3	0.838
LA diameter, mm	37±6	32±5	0.003
PASP, mmHg, median (IQR)	29 (24-36)	27 (22-38)	0.267
TAPSE, mm	17±5	18±5	0.336
TRV, m/s	2.7±0.8	2.6±0.6	0.364
RV diameter, mm	23±4	22±5	0.458
STE parameter			
GWl, mmHg%	1210±304	1362±344	0.091
LVFW WI, mmHg%	1215±331	1394±372	0.068
Septal WI, mmHg%	1198±288	1298±315	0.227
GCW, mmHg%	1499±320	1647±356	0.112
LVFW CW, mmHg%	1485±336	1673±379	0.06
Septal CW, mmHg%	1526±359	1597±350	0.455
GWW, mmHg%, median (IQR)	156 (138-178)	125 (82-181)	0.043
LVFW WW, mmHg%, median (IQR)	152 (131-193)	109 (82-185)	0.02
Septal WW, mmHg%, median (IQR)	165 (124-193)	150 (79-186)	0.301
GWE, %	87.4±4.6	90.9±4.8	0.007
LVFW WE, %	87.1±6.2	91.4±4.5	0.002
Septal WE, %	87.9±4.4	89.8±6.0	0.203
GLS, %	-14.1±3.3	-15.6±3.4	0.09
LVFW LS, %	-13.4±4.6	-15.7±3.9	0.037
Septal LS, %	-12.9±3.5	-14.2±3.4	0.174
PSD, ms	74±25	55±14	0.005
CMR parameter			
Native T1, ms	1408±83	1381±65	0.171
ECV, %	34±7	32±5	0.21
T2, ms	43±3	42±3	0.514

Abbreviations: cTnI, cardiac troponin I; CW, constructive work; ECV, extracellular volume fraction; GCW, left ventricular global constructive work; GLS, left ventricular global longitudinal strain; GWE, left ventricular global work efficiency; GWI, left ventricular global work index; GWW, left ventricular global wasted work; IVSD, inter-ventricular septum thickness at end-diastole; LA, left atrial; LGE, late gadolinium enhancement; LS, longitudinal strain; LVEDD, left ventricular end diastolic diameter; LVEF, left ventricular ejection fraction; LVESD, left ventricular end systolic

diameter; LVFS, left ventricular fraction shortening; LVFW, left ventricular free-wall; LVPWD, the left ventricular posterior wall thickness at end-diastole; NT-proBNP, N-terminal proB-type natriuretic peptide; PASP, systolic pulmonary artery pressure; PSD, left ventricular global peak strain dispersion; RV, right ventricular; SDI, Systemic Lupus International Collaborating Clinics/American College of Rheumatology (SLICC/ACR) Damage Index; SLE, systemic lupus erythematosus; SLEDAI-2K, SLE Disease Activity Index 2000; TAPSE, tricuspid annular plane systolic excursion; TRV, tricuspid regurgitation velocity; WE, work efficiency; WI, work index; WW, wasted work.

Table S3. Clinical and imaging parameters of SLE patients with only septal versus only free-wall fibrosis.

Variables	Only Septal LGE (N=20)	Only LVFW LGE (N=9)	<i>p</i> Value
Conventional echocardiographic parameter			
IVSD, mm	8.1±1.3	9.4±0.7	0.005
LVPWD, mm	8.3±1.1	9.0±1.1	0.106
LVEDD, mm	46±8	48±6	0.634
LVESD, mm	32±8	33±5	0.729
LVEF, %	60±11	59±8	0.853
LVFS, %	32±7	31±6	0.827
E/A ratio	1.2±0.3	1.2±0.5	0.901
LA diameter, mm	32±6	36±6	0.133
PASP, mmHg, median (IQR)	28 (23-34)	28 (24-31)	0.813
TAPSE, mm	17±4	18±5	0.699
TRV, m/s	2.5±0.6	2.4±0.3	0.65
RV diameter, mm	22±6	21±4	0.697
STE parameter			
GWl, mmHg%	1365±398	1303±335	0.689
LVFW WI, mmHg%	1393±440	1315±387	0.649
Septal WI, mmHg%	1309±350	1281±263	0.828
GCW, mmHg%	1643±430	1583±379	0.725
LVFW CW, mmHg%	1667±465	1560±422	0.562
Septal CW, mmHg%	1594±404	1629±382	0.826
GWw, mmHg%, median (IQR)	136 (80-178)	156 (150-170)	0.211
LVFW WW, mmHg%, median (IQR)	130 (76-180)	157 (133-191)	0.12
Septal WW, mmHg%, median (IQR)	146 (75-224)	169 (118-193)	0.572
GWE, %	90.4±5.9	88.4±4.2	0.388
LVFW WE, %	90.8±5.4	87.8±7.1	0.226
Septal WE, %	89.4±7.6	89.6±3.3	0.953
GLS, %	-15.3±4.2	-14.9±3.4	0.806
LVFW LS, %	-15.2±5.0	-13.9±5.6	0.552
Septal LS, %	-14.1±4.3	-13.9±2.4	0.898
PSD, ms	53±16	79±29	0.036
CMR parameter			
Native T1, ms	1378±69	1414±97	0.283
ECV, %	31±5	35±5	0.108
T2, ms	41±2	43±3	0.292
LGE degree, %, median (IQR)	2.05 (1.24-4.86)	3.82 (1.58-5.52)	0.322

Abbreviations are shown in the table S2.

Table S4. The association between myocardial function and the degree of LGE in SLE patients.

Variables	>0% & ≤ 1.94% (N=13)	> 1.94% & ≤ 4.94% (N=13)	> 4.94% (N=13)	<i>p</i> Value
LVEF, %	59±11	62±13	57±10	0.597
PSD, ms	52±11	66±29	72±22	0.021
GLS, %	-14.5±3.6	-15.4±3.6	-14.3±4.4	0.756
LVFW LS, %	-14.3±4.3	-15.2±4.5	-13.5±5.8	0.674
Septal LS, %	-14.4±4.6	-13.3±3.1	-13.0±4.0	0.656
GWI, mmHg%	1290±339	1318±382	1260±384	0.922
LVFW WI, mmHg%	1303±374	1343±421	1273±420	0.906
Septal WI, mmHg%	1263±318	1269±336	1234±336	0.959
GCW, mmHg%	1568±387	1559±423	1590±366	0.979
LVFW CW, mmHg%	1569±422	1570±459	1595±387	0.985
Septal CW, mmHg%	1565±363	1538±405	1580±397	0.961
GWV, mmHg%, median (IQR)	148 (78-168)	154 (117-187)	167 (132-186)	0.507
LVFW WW, mmHg%, median (IQR)	141 (84-161)	132 (85-200)	152 (130-205)	0.254
Septal WW, mmHg%, median (IQR)	154 (87.665-224)	165 (90-221)	145 (106-193)	0.921
GWE, %	90.2±5.5	88.0±6.2	88.5±4.7	0.562
LVFW WE, %	126±47	141±64	177±70	0.103
Septal WE, %	158±86	158±65	158±89	>0.999

Abbreviations: CW, constructive work; GCW, left ventricular global constructive work; GLS, left ventricular global longitudinal strain; GWE, left ventricular global work efficiency; GWI, left ventricular global work index; GWV, left ventricular global wasted work; IQR, interquartile range; LGE, late gadolinium enhancement; LS, longitudinal strain; LVEF, left ventricular ejection fraction; LVFW, left ventricular free wall; PSD, left ventricular global peak strain dispersion; SLE, systemic lupus erythematosus; WE, work efficiency; WI, work index; WW, wasted work.

Table S5. Intra- and inter-observer variability for parameters in the noninvasive LV PSL analysis.

Variables	Intraobserver variability		Interobserver variability	
	ICC (95% CI)	<i>p</i> Value	ICC (95% CI)	<i>p</i> Value
GLS	0.984 (0.974, 0.99)	<0.001	0.976 (0.958, 0.986)	<0.001
PSD	0.997 (0.993, 0.998)	<0.001	0.992 (0.971, 0.997)	<0.001
GWI	0.943 (0.909, 0.965)	<0.001	0.924 (0.879, 0.953)	<0.001
GCW	0.954 (0.916, 0.974)	<0.001	0.965 (0.942, 0.979)	<0.001
GWW	0.988 (0.977, 0.994)	<0.001	0.980 (0.967, 0.988)	<0.001
GWE	0.989 (0.98, 0.994)	<0.001	0.973 (0.933, 0.987)	<0.001

Abbreviations: GCW, left ventricular global constructive work; GLS, left ventricular global longitudinal strain; GWE, left ventricular global work efficiency; GWI, left ventricular global work index; GWW, left ventricular global wasted work; ICC, intraclass correlation coefficient; LV, left ventricular; PSD, left ventricular global peak strain dispersion; PSL, pressure-strain loop.