

Supplementary Table S1 Left atrial parameters analysed and formulas

Variable	Abbreviation	Formula
LA volumetric analysis and LA ejection force		
<b>LA reservoir</b>		
Left atrial total ejection volume	LATEV (ml)	$LAV_{max} - LAV_{min}$
Left atrial total ejection fraction	LATEF (%)	$LATEV / LAV_{max}$
Left atrial ejection index	LAEI (%)	$LATEV / LAV_{min}$
<b>LA conduit function</b>		
Left atrial passive ejection volume	LAPEV (ml)	$LAV_{max} - LAV_{pre-A}$
Left atrial passive ejection fraction	LAPEF (%)	$LAPEV / LAV_{max}$
<b>LA pump function</b>		
Left atrial active ejection volume	LAAEV (ml)	$LAV_{pre-A} - LAV_{min}$
Left atrial active ejection fraction	LAAEF (%)	$LAAEV / LAV_{pre-A}$
Left atrial ejection force	LAEF (kdyne)	$0.5 \times 1.06 \times \text{mitral annulus area} \times (\text{peak A velocity})^2$
LA deformation analysis		
<b>Reservoir function</b>		
Left atrial strain during reservoir phase	LASr (%)	$S_{\text{mitral valve opening}} - S_{\text{LVED}}$
Peak strain rate during reservoir phase	pLASRr ( $\text{sec}^{-1}$ )	positive peak strain rate during reservoir phase
Left atrial stiffness index	LASI	$E/e'_m / LASr$
<b>Conduit function</b>		
Left atrial strain during conduit phase	LAScd (%)	$S_{\text{LVED}} - S_{\text{atrial contraction}}$
Peak strain rate during conduit phase	pLASRcd ( $\text{sec}^{-1}$ )	negative peak strain rate during conduit phase
<b>Contractile function</b>		
Left atrial strain during contractile phase	LASct (%)	$S_{\text{atrial contraction}} - S_{\text{mitral valve opening}}$
Peak strain rate during contractile phase	pLASRct ( $\text{sec}^{-1}$ )	negative peak strain rate during contractile phase

A atrial velocity of mitral flow;  $e'_m$  average of early diastolic velocity of lateral and mitral annulus; LAV<sub>max</sub> left atrial volume during systole; LAV<sub>min</sub> left atrial volume during diastole; LAV<sub>pre-A</sub> left atrial volume before P-wave; LVED left ventricle end-diastole.

Supplementary Table S2 Intra and inter-observer reliability for reservoir, conduit and contractile left atrial strain and strain rate

Parameter	Intra-observer 1		Intra-observer 2		Inter-observer	
	ICC	95% CI	ICC	95% CI	ICC	95% CI
<b>Reservoir function</b>						
LASr (%)	0.9	0.8-0.96	0.92	0.8-0.99	0.84	0.7-0.94
pLASRr ( $\text{sec}^{-1}$ )	0.82	0.71-0.93	0.86	0.9-0.99	0.92	0.8-0.96
<b>Conduit function</b>						
LAScd (%)	0.78	0.81-0.9	0.9	0.82-0.99	0.8	0.7-0.88
pLASRcd ( $\text{sec}^{-1}$ )	0.82	0.7-0.89	0.89	0.8-0.93	0.9	0.82-0.96
<b>Contractile function</b>						
LASct (%)	0.79	0.7-0.88	0.94	0.9-0.99	0.86	0.8-0.9
pLASRct ( $\text{sec}^{-1}$ )	0.86	0.8-0.92	0.89	0.8-0.92	0.71	0.7-0.9

CI confidence interval; ICC intraclass coefficient correlation; LASct left atrial strain during contractile phase; LASr left atrial strain during reservoir phase; pLASRr peak strain rate during reservoir phase; pLASRcd peak strain rate during conduit phase; pLASRct peak strain rate during contractile phase.

Supplementary Table S3 Association of two-dimensional echocardiography characteristics with LVH due to hypertrophic cardiomyopathy after adjustment for age and sex in all subjects with LVH (n=86)

Variables	Univariate analysis		Multivariate analysis	
	Odds ratio (95% CI)	p	Odds ratio (95% CI)	p
IVS (mm)	1.39 (1.05-1.43)	<0.001	1 (0.6-1.6)	0.051
E/e's	1.27 (0.88-0.98)	0.03	0.5 (0.2-1.4)	0.07
E/e'l	0.69 (0.42-0.86)	0.035	0.6 (0.1-1.4)	0.08
LAV <sub>max</sub> (ml/m <sup>2</sup> )	1.02 (1.05-1.73)	0.001	0.8 (0.2-1)	0.9
LASr (%)	0.11 (0.9-1.3)	0.058		
pLASRr (sec <sup>-1</sup> )	0.45 (0.5-0.97)	0.04	0.1 (0.1-0.9)	0.81
LASr/IVS	0.22 (0.91-1.06)	0.06		
pLASRr/IVS	0.98 (0.97-1.1)	0.05		
LASI	0.3 (0.1-0.9)	0.04	0.2 (0.1-0.95)	0.45
LAScd (%)	0.99 (0.96-1.04)	0.06		
pLASRcd (sec <sup>-1</sup> )	1.04 (1.01-1.31)	0.021	0.6 (1.3-2.1)	0.06
LAScd/IVS	1.8 (1.1-1.47)	0.02	0.5 (1.1-2.3)	0.05
pLAScd/IVS	1.1 (0.9-1.4)	0.09		
LASct (%)	1.2 (0.8-0.92)	0.01	1 (0.7-1.2)	0.05
pLASRct (sec <sup>-1</sup> )	1.1 (0.7-0.99)	0.04	1.1 (0.6-1.3)	0.06
LASct/IVS	1.8 (0.86-0.97)	<0.001	1.4 (0.7-0.9)	0.02
pLASRct/IVS	1.6 (0.8-0.99)	0.001	1.2 (0.7-0.98)	0.03

CI confidence interval; e'l early diastolic velocity of lateral annulus; e's early diastolic velocity of mitral annulus; IVS interventricular septum; LAScd left atrial strain during conduit phase; LASct left atrial strain during contractile phase; LASi left atrial stiffness index; LASr left atrial strain during reservoir phase; LAV<sub>max</sub> left atrial volume during systole; LVH left ventricular hypertrophy; pLASRcd peak strain rate during conduit phase; pLASct peak strain rate during contractile phase; pLASRr peak strain rate during reservoir phase.