

Appendix 1***Transthoracic echocardiography (TTE)***

M-mode echocardiography was performed on an apical four-chamber view, with the sampling cursor placed at the lateral wall of the tricuspid annulus. The sampling line was aligned parallel to the right ventricular free wall as much as possible. Tricuspid annular plane systolic excursion (TAPSE, mm) was measured as the displacement of the tricuspid annulus from end-diastole to end-systole. The right ventricular myocardial performance index (RVMPI) was calculated using the formula: $RVMPI = (\text{right ventricular isovolumic contraction time} + \text{right ventricular isovolumic relaxation time}) / \text{right ventricular ejection time}$. Tricuspid annular systolic peak velocity (S' , cm/s) was measured in the apical four-chamber view using pulsed wave tissue Doppler imaging (TDI), ensuring that the Doppler beam was aligned parallel to the longitudinal axis of the right ventricular free wall. The right ventricular outflow tract acceleration time (RVOT-AT, ms) was defined as the time from the onset of spectral systole to the peak systolic blood flow velocity. RVOT-AT was measured in the parasternal short-axis view, with the spectral Doppler sampling volume positioned in the right ventricular outflow tract near the pulmonary valve and adjusted to the correct angle.

Table S1 Description of RHC, TTE and CTPA examinations results

Examinations	Parameters	Value
RHC	sRAP (mmHg)	9.29±12.34
	dRAP (mmHg)	2.17±2.40
	mRAP (mmHg)	4.72±2.97
	sRVP (mmHg)	74.69±24.70
	dRVP (mmHg)	-0.65±4.94
	mRVP (mmHg)	27.42±9.69
	sPAP (mmHg)	76.04±25.29
	dPAP (mmHg)	27.36±10.02
	mPAP (mmHg)	45.36±13.80
	CI (L/min/m ²)	2.72±0.77
	CO (L/min)	4.72±1.34
	PCWP (mmHg)	7.37±3.08
	PVR (WU)	9.19±5.25
TTE	TAPSE (mm)	17.68±3.98
	RVMPI	0.67±0.35
	S' (cm/s)	11.38±2.94
	RVOT-AT (ms)	67.51±15.90
CTPA	Cobb angle (°)	53.35±14.31
	Cobb angle/a (°)	0.23±0.07
	Cobb angle/b (°)	0.49±0.16
	Cobb angle/c (°)	0.43±0.09
	Cobb angle/d (°)	0.50±0.15
	Cobb angle/BSA (°)	30.97±9.11

Measurement data was presented as mean ± standard deviation. a, thoracic longitudinal diameter; b, thoracic transverse diameter; BSA, body surface area; c, pericardial longitudinal diameter; CI, cardiac index; CO, cardiac output; CTPA, computed tomography pulmonary angiography; d, pericardial transverse diameter; dPAP, diastolic pulmonary artery pressure; dRVP, diastolic right ventricular pressure; dRAP, diastolic right atrial pressure; mPAP, mean pulmonary artery pressure; mRVP, mean right ventricular pressure; mRAP, mean right atrial pressure; PCWP, pulmonary capillary wedge pressure; PVR, pulmonary vascular resistance; RHC, right heart catheterization; RVMPI, right ventricular myocardial performance index; RVOT-AT, right ventricular outflow tract acceleration time; sPAP, systolic pulmonary artery pressure; sRVP, systolic right ventricular pressure; sRAP, systolic right atria pressure; S', tricuspid annular systolic peak velocity; TAPSE, tricuspid annular plane systolic excursion; TTE, transthoracic echocardiography; WU, Wood Unit.

Table S2 Correlation of Cobb angle and TTE parameters with hemodynamic parameters

Parameters	RVMPI	S'	TAPSE	RVOT-AT	Cobb angle
sRAP	0.344	-0.049	-0.214	-0.379	0.344
dRAP	0.339	-0.146	-0.331	-0.137	0.194
mRAP	0.329	-0.122	-0.226	-0.302	0.293
sRVP	0.294	0.03	-0.07	-0.173	0.011
dRVP	0.1	-0.07	-0.302	-0.499	0.61
mRVP	0.288	-0.022	-0.33	-0.553	0.618
sPAP	0.279	0.027	-0.321	-0.524	0.62
dPAP	0.374	-0.143	-0.444	-0.497	0.592
mPAP	0.363	-0.075	-0.41	-0.392	0.659
CI	-0.323	0.375	0.486	0.507	-0.447
CO	-0.306	0.42	0.532	0.556	-0.429
PCWP	-0.043	-0.288	0.079	0.111	-0.056
PVR	0.423	0.145	-0.577	-0.643	0.725

CI, cardiac index; CO, cardiac output; dPAP, diastolic pulmonary artery pressure; dRVP, diastolic right ventricular pressure; dRAP, diastolic right atrial pressure; mPAP, mean pulmonary artery pressure; mRVP, mean right ventricular pressure; mRAP, mean right atrial pressure; PCWP, pulmonary capillary wedge pressure; PVR, pulmonary vascular resistance; RVMPI, right ventricular myocardial performance index; RVOT-AT, right ventricular outflow tract acceleration time; sPAP, systolic pulmonary artery pressure; sRVP, systolic right ventricular pressure; sRAP, systolic right atrial pressure; S', tricuspid annular systolic peak velocity; TAPSE, tricuspid annular plane systolic excursion; TTE, transthoracic echocardiography.

Table S3 Results of the univariate linear regression analysis of TTE parameters and CTPA parameters to PVR

Examinations	Parameters	β value	R ²	P value
TTE	TAPSE	-0.513	0.263	<0.001
	RVMPI	0.252	0.064	0.038
	S'	-0.266	0.071	0.024
	LnRVOT-AT	-0.658	0.443	<0.001
CTPA	Cobb angle	0.671	0.450	<0.001
	Cobb angle/a	0.675	0.456	<0.001
	Cobb angle/b	0.601	0.361	<0.001
	Cobb angle/c	0.647	0.419	<0.001
	Cobb angle/d	0.637	0.406	<0.001
	Cobb angle/BSA	0.714	0.510	<0.001

R²: coefficient of determination; β : standardized regression coefficients. a, thoracic longitudinal diameter; b, thoracic transverse diameter; c, pericardial longitudinal diameter; BSA, body surface area; CTPA, computed tomography pulmonary angiography; d, pericardial transverse diameter; RVMPI, right ventricular myocardial performance index; RVOT-AT, right ventricular outflow tract acceleration time; S', tricuspid annular systolic peak velocity; TAPSE, tricuspid annular plane systolic excursion; TTE, transthoracic echocardiography.

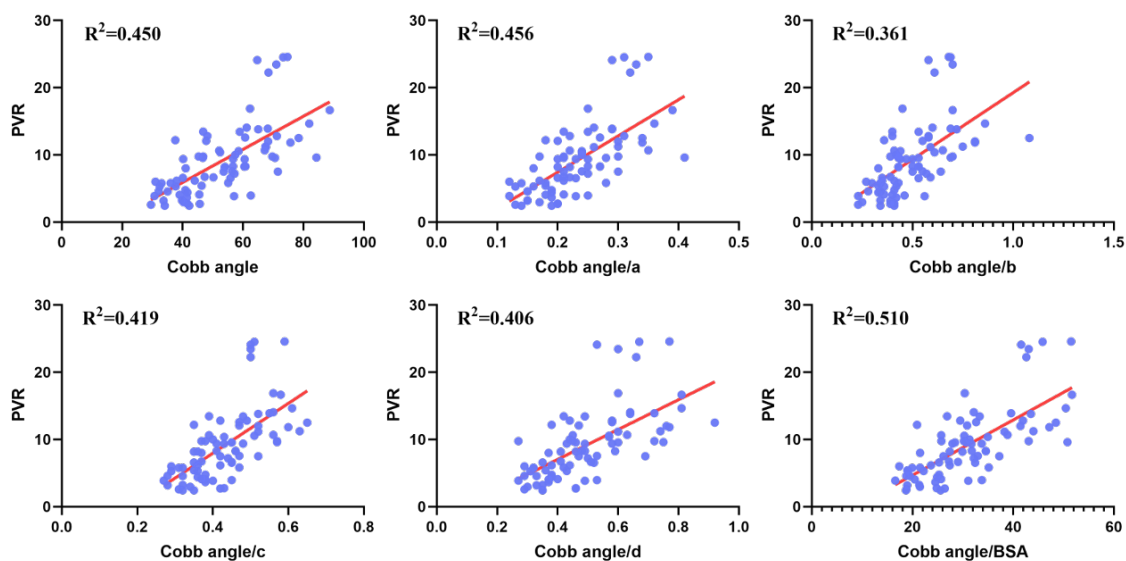


Figure S1 Scatter plot of the univariate linear regression analysis of CTPA parameters to PVR. a, thoracic longitudinal diameter; b, thoracic transverse diameter; BSA, body surface area; c, pericardial longitudinal diameter; CTPA, computed tomography pulmonary angiography; d, pericardial transverse diameter; PVR, pulmonary vascular resistance.

Table S4 Analysis of univariate and multivariate Cox regression for the prediction of heart failure

Variables	Univariate		Multivariate	
	HR (95% CI)	P value	HR (95% CI)	P value
Gender	1.693 (0.723–3.965)	0.225	–	–
Age	1.054 (1.026–1.083)	<0.001	–	–
BMI	0.971 (0.859–1.099)	0.644	–	–
The duration of disease	1.003 (0.997–1.008)	0.366	–	–
Cobb angle	1.037 (1.009–1.065)	0.009	1.057 (1.025–1.090)	<0.001
Cobb angle/BSA	1.051 (1.010–1.094)	0.015	1.087 (1.038–1.139)	<0.001
TAPSE	0.871 (0.781–0.972)	0.014	0.878 (0.791–0.973)	0.014
RVMPI	6.313 (2.458–16.213)	<0.001	5.324 (2.077–13.647)	<0.001
S'	0.951 (0.820–1.103)	0.509	–	–
RVOT-AT	0.964 (0.936–0.993)	0.014	0.968 (0.939–0.997)	0.030

BMI, body mass index; BSA, body surface area; CI, confidence interval; HR, hazard ratio; RVMPI, right ventricular myocardial performance index; RVOT-AT, right ventricular outflow tract acceleration time; S', tricuspid annular systolic peak velocity; TAPSE, tricuspid annular plane systolic excursion.