TABLE S1 CCUE Exam Protocol (Critical Care Chest Ultrasonic Examination for Emergency)

Assessment	Views/Sites	Assessment findings by eyeballing
Heart	PLAX(parasternal long axis)	Normal left ventricle Normal right ventricle Left ventricle systolic dysfunction Enlarged left ventricle Decreased left ventricle Right ventricular systolic dysfunction Enlarged right ventricle D sign Enlarged left atrium Enlarged right atrium Enlarged double atrium Expanded IVC Collapsed IVC Normal IVC
	PSAX(parasternal short axis)	
	A4CH(apical four chamber)	
	SLAX(subcostal long axis)	
	SIVC(subcostal inferior vena cava)	
Lung	Upper BLUE points (the root of the middle finger and the ring fingers of the upper hand)	Normal lung Pneumothorax Lung edema Interstitial diseases Consolidation Infarction Pleural effusion
	Lower BLUE points (the middle of the palm of the lower hand	
	Phrenic line (lower edge of the lower hand)	
	Posterolateral alveolar and/or pleural syndrome (PLAPS) point (posterior projection of the lower BLUE point on the posterior axillary line)	
	Posterior BLUE point (area between the infrascapular line and the spine)	

TABLE S2 Detailed Ultrasonic Assessment for Hemodynamics Protocol

Subjects	Assessment or Measured Ultrasonic Index	Rationale	Ultrasonic Views
Heart structure changes due to acute or chronic cardiopathy	Eyeballing	The chamber size, wall dimension and the valves are estimated	PLAX(parasternal long axis) PSAX(parasternal short axis) A4CH(apical four chamber) SLAX(subcostal long axis) SIVC(subcostal inferior vena cava)
Volume status/fluid responsiveness	IVCd, dIVC, PLR-△VTI LV eccentricity index, FS	The cutoff value of the indexes are: dIVC 15%; PLR-△VTI 10%; LV eccentricity index 1; FS 24–36%	
RV	RV/LV area ratio; TAPSE; left ventricle eccentricity index	The cutoff value of the indexes are: RV/LV area ratio 0.6; TAPSE 1.6	
Diastole/Systole of left heart	E/A; E/e'; e'/a'; EF; FS; Sd, SV	E/e' > 14 or E/A > 2 indicates elevated left atrium pressure; The cutoff value of the Sd is 11mm; the other indexes are determined by the clinical situation.	
Afterload	Estimated by SV and blood pressure		
Lung water	The feature and numbers of B lines		Lung ultrasound exam

IVCd = diameter of Inferior Vena Cava, dIVC = distensibility index of Inferior Vena Cava, PLR-△VTI = fractional left ventricular outflow tract-Velocity Time Integral change induced by passive leg raising, RV = right ventricle, LV = left ventricle, TAPSE = tricuspid annular plane systolic excursion, E/A = early diastolic transmitral velocity to late diastolic transmitral velocity ratio, E/e' = early diastolic transmitral velocity to early mitral annulus diastolic velocity ratio, e'/a' = early mitral annulus diastolic velocity to late early mitral annulus diastolic velocity, EF = ejection fraction with modified Simpson's rule, FS = fraction of shorten, Sd = systolic peak velocity of mitral annulus, SV = stroke volume.

TABLE S3 Volume Focused Ultrasonic Assessment

Ultrasonic Views	Assessment or Measured Ultrasonic Index	Rationale
A4CH(apical four chamber)	E/A, E/e', eyeballing the size of left atrium	One of the two situations indicates volume overload: 1.The distended filling and fixed IVC or the diameter of IVC ＞ 2cm with distensibility index of Inferior Vena Cava less than 15%; 2. Diffused bilateral multiple B lines with E/e' > 14 or E/A ＞2 or enlarged left atrium
SIVC(subcostal inferior vena cava)	Diameter of IVC， dIVC	
Lung ultrasound	The feature and numbers of B lines	

E/A = early diastolic transmitral velocity to late diastolic transmitral velocity ratio, E/e' = early diastolic transmitral velocity to early mitral annulus diastolic velocity ratio, IVC = Inferior Vena Cava, dIVC = distensibility index of Inferior Vena Cava.

TABLE S4 Ultrasonic Signs of Corresponding Pathology

Pathology indicated by ultrasonic signs	Ultrasonic signs
Massive pulmonary embolism	Acute right heart dilatation and tricuspid regurgitation, with a distended and fixed IVC; McConnell sign may be presence.
Pneumothorax	Absence of lung sliding; presence of stratosphere sign; lung point can be found
Cardiac tamponade	Right ventricle collapse in early diastole; right atrium collapse in end systole; heart swinging; distended and fixed IVC
Severe hypovolemia	Kissing sign; collapsed IVC
Severe pump failure	Eyeballing: hypokinesis heart
Vascular paralysis	the decrease of blood pressure without pump failure

IVC = Inferior Vena Cava