

Supplementary table 1. ICD-9 and ICD-10 codes used to screen of patients with congestive heart failure.

	ICD-9	ICD-10
428	4258	40411
4280	4259	40413
4281	4284	40491
4282	42840	40493
42821	42841	
42822	42842	
42823	42843	
4283	4289	
42830	39891	
42831	40201	
42832	40211	
4254	40291	
4255	40401	
4257	40403	

Supplementary table 2. Baseline characteristics of study participants according to threshold of RAR from the threshold effect analysis.

	Overall (n=4506)	RAR < 5.25 (n=2931)	RAR ≥ 5.25 (n=1575)	<i>p</i> value
age(years)	72.08 (14.38)	72.28 (14.36)	71.71 (14.42)	0.212
male, n(%)	2537 (56.3)	702 (62.3)	616 (54.7)	<0.001
diabetes, n(%)	1836 (40.7%)	1184 (40.4%)	652 (41.4%)	0.514
hypertension, n(%)	3412 (75.7%)	2288 (78.1%)	1124 (71.4%)	<0.001
COPD, n(%)	913 (20.3%)	583 (19.9%)	330 (21.0%)	0.398
CKD, n(%)	993 (22.0%)	606 (20.7%)	387 (24.6%)	0.003
sepsis, n(%)	2976 (66.0%)	1786 (60.9%)	1190 (75.6%)	<0.001
heart rate(/min)	90.53 (21.41)	89.36 (20.78)	92.71 (22.39)	<0.001
resp rate(/min)	20.94 (6.33)	20.87 (6.18)	21.06 (6.61)	0.356
SpO2(%)	97.00 (94.00, 100.00)	97.00 (95.00, 99.00)	97.00 (94.00, 100.00)	0.141
SBP(mmHg)	121.56 (25.77)	124.79 (25.92)	115.54 (24.36)	<0.001
WBC(10 ⁹ /L)	11.00 (7.90, 15.70)	10.80 (7.90, 14.90)	11.60 (7.70, 17.20)	0.001
hemoglobin(g/dL)	10.88 (2.48)	11.52 (2.34)	9.67 (2.29)	<0.001
platelets(10 ⁹ /L)	204.00 (149.00, 277.00)	208.00 (159.00, 272.00)	198.00 (127.00, 292.00)	<0.001
RDW(%)	15.15 (14.00, 16.98)	14.50 (13.60, 15.60)	17.20 (15.60, 19.20)	<0.001
lymphocytes(10 ⁹ /L)	1.03 (0.63, 1.60)	1.08 (0.67, 1.65)	0.95 (0.58, 1.50)	<0.001
neutrophils(10 ⁹ /L)	8.80 (5.87, 13.43)	8.59 (5.87, 12.57)	9.35 (5.86, 14.91)	<0.001
PNI	38.75 (33.60, 43.80)	41.44 (37.61, 45.82)	32.24 (28.25, 36.60)	<0.001
total protein(g/dL)	5.58 (1.04)	5.86 (0.95)	5.07 (1.02)	<0.001
albumin(g/dL)	3.26 (0.62)	3.57 (0.43)	2.69 (0.51)	<0.001
ALT(U/L)	26.00 (16.00, 54.00)	27.00 (17.00, 54.00)	25.00 (15.00, 54.00)	0.004
AST(U/L)	39.00 (24.00, 84.00)	39.00 (24.00, 82.00)	40.00 (24.00, 86.50)	0.678
ALP(U/L)	89.00 (66.00, 128.00)	85.00 (65.00, 118.00)	98.00 (69.00, 150.00)	<0.001

total bilirubin(mg/dl)	0.70 (0.40, 1.20)	0.60 (0.40, 1.00)	0.70 (0.40, 1.50)	<0.001
BUN(mg/dl)	30.00 (19.00, 48.00)	27.00 (19.00, 44.00)	35.00 (21.00, 56.00)	<0.001
creatinine(mg/dl)	1.40 (0.90, 2.20)	1.30 (0.90, 2.00)	1.50 (1.00, 2.50)	<0.001
albuminuria(mg/dl)	77.00 (30.00, 77.00)	77.00 (30.00, 77.00)	77.00 (30.00, 100.00)	0.978
glucose(mg/dl)	136.00 (108.00, 184.00)	146.00 (115.00, 197.00)	139.00 (113.00, 189.00)	<0.001
LVEF(%)	46.44 (47.15)	46.39 (57.41)	46.53 (15.09)	0.903
inotropes/vasopressors, n(%)	1797 (39.9%)	1030 (35.1%)	767 (48.7%)	<0.001
CRRT, n(%)	342 (7.6%)	177 (6.0%)	165 (10.5%)	<0.001
ventilation, n(%)	1801 (40.0%)	1106 (37.7%)	695 (44.1%)	<0.001
SOFA	6.60 (4.00)	5.94 (3.70)	7.84 (4.23)	<0.001
APACHE II	67.15 (24.64)	62.43 (22.36)	75.91 (26.23)	<0.001
mortality, n(%)	1944 (43.1%)	1036 (35.3%)	908 (57.7%)	<0.001

COPD, chronic obstructive pulmonary disease; CKD, chronic kidney disease; SBP, systolic blood pressure; SpO₂, saturation of peripheral oxygen; WBC, white blood cell count; RDW, red cell distribution width; PNI, prognostic nutritional index; ALT, alanine aminotransferase; AST, aspartate aminotransferase; ALP, alkaline phosphatase; BUN, blood urea nitrogen; LVEF, left ventricular ejection fraction; CRRT, continuous renal replacement therapy; SOFA, sequential organ failure assessment; APACHE II, Acute Physiology and Chronic Health Evaluation II.

Supplementary table 3. Threshold effect analysis of the relationship between red cell distribution width - albumin ratio and all-cause mortality.

	Threshold of RAR	HR 95CI%	<i>p</i> value
1-line cox regression model	-	1.20 (1.15~1.25)	< 0.001
2-line cox regression model	< 5.25	1.64 (1.47~1.84)	< 0.001
	≥5.25	1.19 (1.14~1.24)	< 0.001
Likelihood Ratio test	-		< 0.001

Data were adjusted for age, gender, diabetes, hypertension, CKD, sepsis, PNI score, neutrophils, hemoglobin, albumin, total bilirubin, BUN, creatinine, inotropes or vasopressors, LVEF, CRRT, ventilation, SOFA and APACHE II.

Supplementary table 4. Concordance index for five models in predicting the all-cause mortality.

models	concordance index	<i>p</i> value
RAR	0.622 (0.609~0.635)	-
SOFA	0.636 (0.623~0.649)	<0.001
SOFA + RAR	0.658 (0.650~0.676)	
APACHE II	0.682 (0.669~0.695)	<0.001
APACHE II + RAR	0.695 (0.682~0.708)	

Supplementary table 5. Modified Poisson regression models for the association between red cell distribution width - albumin ratio and all-cause mortality in 1 year.

RAR	Case/Total	Model 0	Model 1	Model 2	Model 3
Quartiles	-	Relative Risk			
Q1	1126/4506	reference	reference	reference	reference
Q2	1127/4506	1.23 (1.09,1.39)	1.15 (1.02,1.29)	1.12 (0.99,1.27)	1.14 (1.01,1.28)

Q3	1126/4506	1.74 (1.56,1.94)	1.61 (1.45,1.79)	1.53 (1.35,1.73)	1.54 (1.36,1.74)
Q4	1127/4506	2.14 (1.93,2.38)	1.98 (1.78,2.19)	1.85 (1.59,2.16)	1.83 (1.57,2.13)
<i>p</i> for trend	-	< 0.001	< 0.001	< 0.001	< 0.001
Per quartile increase	-	1.30(1.26,1.34)	1.27 (1.23,1.31)	1.25 (1.19,1.31)	1.24 (1.18,1.30)
Per unit increase	-	1.15 (1.14,1.17)	1.15 (1.13,1.16)	1.14 (1.11,1.17)	1.12 (1.09,1.15)

Model 0: red cell distribution width - albumin ratio without adjust; Model 1: age, gender, diabetes, hypertension, CKD, sepsis, and PNI score were adjusted; Model 2: the variables in Model 1 plus neutrophils, hemoglobin, albumin, total bilirubin, BUN, creatinine, inotropes or vasopressors, CRRT and ventilation were adjusted; Model 3: the variables in Model 2 plus SOFA and APACHE II were adjusted.