

**Supplementary Table SI.** Baseline characteristics of patients with and without albumin measurements

<b>Variables</b>	<b>Total (n = 973)</b>	<b>Alb missing (n = 323)</b>	<b>Alb available (n = 650)</b>	<b>P-value</b>
Age [year]	60.0 ±17.3	61.5 ±17.3	59.2 ±17.2	0.044
Gender, n (%)				0.426
Female	409 (42.0)	130 (40.2)	279 (42.9)	
Male	564 (58.0)	193 (59.8)	371 (57.1)	
Race, n (%)				0.087
Other	362 (37.2)	108 (33.4)	254 (39.1)	
White	611 (62.8)	215 (66.6)	396 (60.9)	
Vital signs				
Heart rate [bpm]	97 (82, 114)	93 (78, 107)	100 (85, 117)	< 0.001
MBP [mm Hg]	86 (73, 100)	85 (73, 100.5)	86 (73, 99)	0.828
SpO2 (%)	97 (94, 99)	97 (95, 99)	96 (94, 99)	0.222
Score system [points]				
SOFA	4 (1, 7)	1 (0, 3)	5 (3, 9)	< 0.001
CCI	4 (2, 6)	4 (2, 6)	4 (2, 6)	0.868
Comorbidity disease, n (%)				
Hypertension	388 (39.9)	137 (42.4)	251 (38.6)	0.254
Obesity	116 (11.9)	44 (13.6)	72 (11.1)	0.249
Diabetes	299 (30.7)	104 (32.2)	195 (30)	0.484
AKI	642 (66.0)	164 (50.8)	478 (73.5)	< 0.001
Sepsis	593 (60.9)	141 (43.7)	452 (69.5)	< 0.001
Laboratory results				
WBC [k/μl]	12.1 (8.3, 17.5)	11.4 (7.7, 16.0)	12.6 (8.7, 18.1)	0.003
Hemoglobin [g/dl]	11.2 ±2.4	11.1 ±2.4	11.3 ±2.5	0.133
BUN [mg/dl]	19.0 (12.0, 34.2)	17.5 (11.0, 31.0)	20.0 (13.0, 36.0)	0.006
Creatinine [μmol/l]	1.0 (0.7, 1.7)	1.0 (0.7, 1.6)	1.1 (0.7, 1.8)	0.02
Glucose [mg/dl]	125.0 (102.0, 170.0)	123.0 (102.0, 160.8)	126.0 (103.0, 177.0)	0.088
AST [U/l]	75.0 (36.0, 184.0)	57.0 (27.0, 148.0)	80.0 (38.2, 200.0)	< 0.001
ALT [U/l]	58.0 (27.0, 169.2)	61.5 (34.0, 160.8)	55.0 (25.2, 170.8)	0.11
Total bilirubin [mg/dl]	1.1 (0.6, 2.9)	0.9 (0.5, 2.4)	1.2 (0.6, 3.3)	0.007
Interventions, n (%)				
Vasopressor	311 (32.0)	71 (22)	240 (36.9)	< 0.001
Octreotide	78 (8.0)	10 (3.1)	68 (10.5)	< 0.001
Statin	190 (19.5)	60 (18.6)	130 (20)	0.598
Insulin	588 (60.4)	137 (42.4)	451 (69.4)	< 0.001
Fibrate	95 (9.8)	11 (3.4)	84 (12.9)	< 0.001
ERCP	61 (6.3)	27 (8.4)	34 (5.2)	0.058

Ventilation	734 (75.4)	204 (63.2)	530 (81.5)	< 0.001
CRRT	101 (10.4)	9 (2.8)	92 (14.2)	< 0.001
Outcomes				
Hospital stay [day]	10.6 (5.8, 20.1)	7.5 (4.4, 14.1)	12.9 (6.8, 23.6)	< 0.001
ICU stay [day]	2.6 (1.2, 6.0)	1.4 (0.9, 2.3)	3.7 (1.8, 9.7)	< 0.001
VDF-28 [day]	27.0 (24.5, 28.0)	27.6 (26.8, 28.0)	26.3 (22.2, 27.7)	< 0.001
Hospital mortality, <i>n</i> (%)	124 (12.7)	28 (8.7)	96 (14.8)	0.007
ICU mortality, <i>n</i> (%)	74 (7.6)	11 (3.4)	63 (9.7)	< 0.001
90-day mortality, <i>n</i> (%)	173 (17.8)	35 (10.8)	138 (21.2)	< 0.001
365-day mortality, <i>n</i> (%)	224 (23.0)	54 (16.7)	170 (26.2)	< 0.001

MBP – mean blood pressure, SpO<sub>2</sub> – saturation of peripheral oxygen, SOFA – sequential organ failure assessment, CCI – Charlson comorbidity index, AKI – acute kidney injury, WBC – white blood cell, BUN – blood urea nitrogen, AST – alanine aminotransferase, ALT – aspartate aminotransferase, ERCP – endoscopic retrograde cholangiopancreatography, CRRT – continuous renal replacement therapy, ICU – intensive care unit, VEF-28 – ventilator free days in 28 days.

**Supplementary Table SII.** Missing number of variables

Variables	Miss number	Miss percentage (%)
Age	0	0
Gender	0	0
Race	0	0
Heart rate	1	0.1538
MBP	1	0.1538
SpO <sub>2</sub>	1	0.1538
SOFA	1	0.1538
CCI	0	0
Hypertension	0	0
Obesity	0	0
Diabetes	0	0
AKI	0	0

Sepsis	0	0
WBC	2	0.3077
Hemoglobin	2	0.3077
Albumin	0	0
BUN	0	0
Creatinine	0	0
Glucose	2	0.3077
AST	43	6.6154
ALT	45	6.9231
Total bilirubin	47	7.2308
Vasopressor	0	0
Octreotide	0	0
Statin	0	0
Insulin	0	0
Fibrate	0	0
ERCP	0	0
Ventilation	0	0
CRRT	0	0

BAR – blood urea nitrogen to serum albumin ratio, MBP – mean blood pressure, SpO<sub>2</sub> – saturation of peripheral oxygen, SOFA – sequential organ failure assessment, CCI – Charlson comorbidity index, AKI – acute kidney injury, WBC – white blood cell, BUN – blood urea nitrogen, AST – alanine aminotransferase, ALT – aspartate aminotransferase, ERCP – endoscopic retrograde cholangiopancreatography, CRRT – continuous renal replacement therapy.

**Supplementary Table SIII.** Sensitivity analysis of patients after excluded those with missing data from the study

Variables	Model 1		Model 2		Model 3	
	HR (95% CI)	<i>P</i> -value	HR (95% CI)	<i>P</i> -value	HR (95% CI)	<i>P</i> -value
90-day mortality						
Continuous	1.05 (1.04~1.06)	< 0.001	1.04 (1.03~1.06)	< 0.001	1.04 (1.02~1.06)	< 0.001
Quartile						
Q1	1 (ref)		1 (ref)		1 (ref)	
Q2	3.22 (1.30~7.99)	0.012	2.99 (1.21~7.43)	0.018	2.07 (0.82~5.21)	0.122
Q3	5.08 (2.12~12.19)	< 0.001	4.48 (1.87~10.77)	0.001	2.47 (0.99~6.16)	0.053
Q4	9.42 (4.01~22.15)	< 0.001	7.12 (3.00~16.9)	< 0.001	3.34 (1.29~8.62)	0.013
<i>P</i> for trend		< 0.001		< 0.001		0.01
365-day mortality						
Continuous	1.04 (1.03~1.06)	< 0.001	1.04 (1.03~1.05)	< 0.001	1.04 (1.02~1.06)	< 0.001
Quartile						
Q1	1 (ref)		1 (ref)		1 (ref)	
Q2	2.57 (1.29~5.14)	0.008	2.46 (1.23~4.93)	0.011	1.73 (0.86~3.52)	0.126
Q3	3.41 (1.74~6.68)	< 0.001	3.14 (1.59~6.17)	0.001	1.76 (0.86~3.61)	0.121
Q4	5.89 (3.06~11.35)	< 0.001	4.83 (2.47~9.45)	< 0.001	2.35 (1.10~5.03)	0.028
<i>P</i> for trend		< 0.001		< 0.001		0.041

Model 1: adjusted for age, gender. Model 2: adjusted for Model 1 plus obesity, diabetes, AKI. Model 3: adjusted for Model 2 plus SOFA, CCI, WBC, creatinine, total bilirubin, vasopressor, CRRT. AKI – acute kidney injury, SOFA – sequential organ failure assessment, CCI – Charlson comorbidity index, WBC – white blood cell, CRRT – continuous renal replacement therapy.

**Supplementary Table SIV.** Sensitivity analysis of patients after excluded those with ICU stay < 24 h

Variables	Model 1		Model 2		Model 3	
	HR (95% CI)	<i>P</i> -value	HR (95% CI)	<i>P</i> -value	HR (95% CI)	<i>P</i> -value
90-day mortality						
Continuous	1.05 (1.03~1.06)	< 0.001	1.05 (1.03~1.06)	< 0.001	1.04 (1.02~1.06)	< 0.001
Quartile						
Q1	1 (ref)		1 (ref)		1 (ref)	
Q2	3.24 (1.31~7.98)	0.011	3.06 (1.24~7.55)	0.015	2.51 (1.01~6.24)	0.048
Q3	4.38 (1.82~10.58)	0.001	4.08 (1.69~9.84)	0.002	2.72 (1.11~6.70)	0.029
Q4	8.42 (3.58~19.83)	< 0.001	6.78 (2.86~16.08)	< 0.001	3.59 (1.41~9.16)	0.007
<i>P</i> for trend		< 0.001		< 0.001		0.012
365-day mortality						
Continuous	1.04 (1.03~1.06)	< 0.001	1.04 (1.03~1.05)	< 0.001	1.03 (1.02~1.05)	< 0.001
Quartile						
Q1	1 (ref)		1 (ref)		1 (ref)	
Q2	2.36 (1.18~4.73)	0.015	2.28 (1.14~4.57)	0.02	1.93 (0.95~3.89)	0.067
Q3	3.02 (1.53~5.95)	0.001	2.89 (1.46~5.7)	0.002	2.06 (1.02~4.15)	0.043
Q4	5.42 (2.81~10.43)	< 0.001	4.59 (2.35~8.95)	< 0.001	2.66 (1.26~5.61)	0.01
<i>P</i> for trend		< 0.001		< 0.001		0.017

Model 1: adjusted for age, gender. Model 2: adjusted for Model 1 plus obesity, diabetes, AKI. Model 3: adjusted for Model 2 plus SOFA, CCI, WBC, creatinine, total bilirubin, vasopressor, CRRT. AKI – acute kidney injury, SOFA – sequential organ failure assessment, CCI – Charlson comorbidity index, WBC – white blood

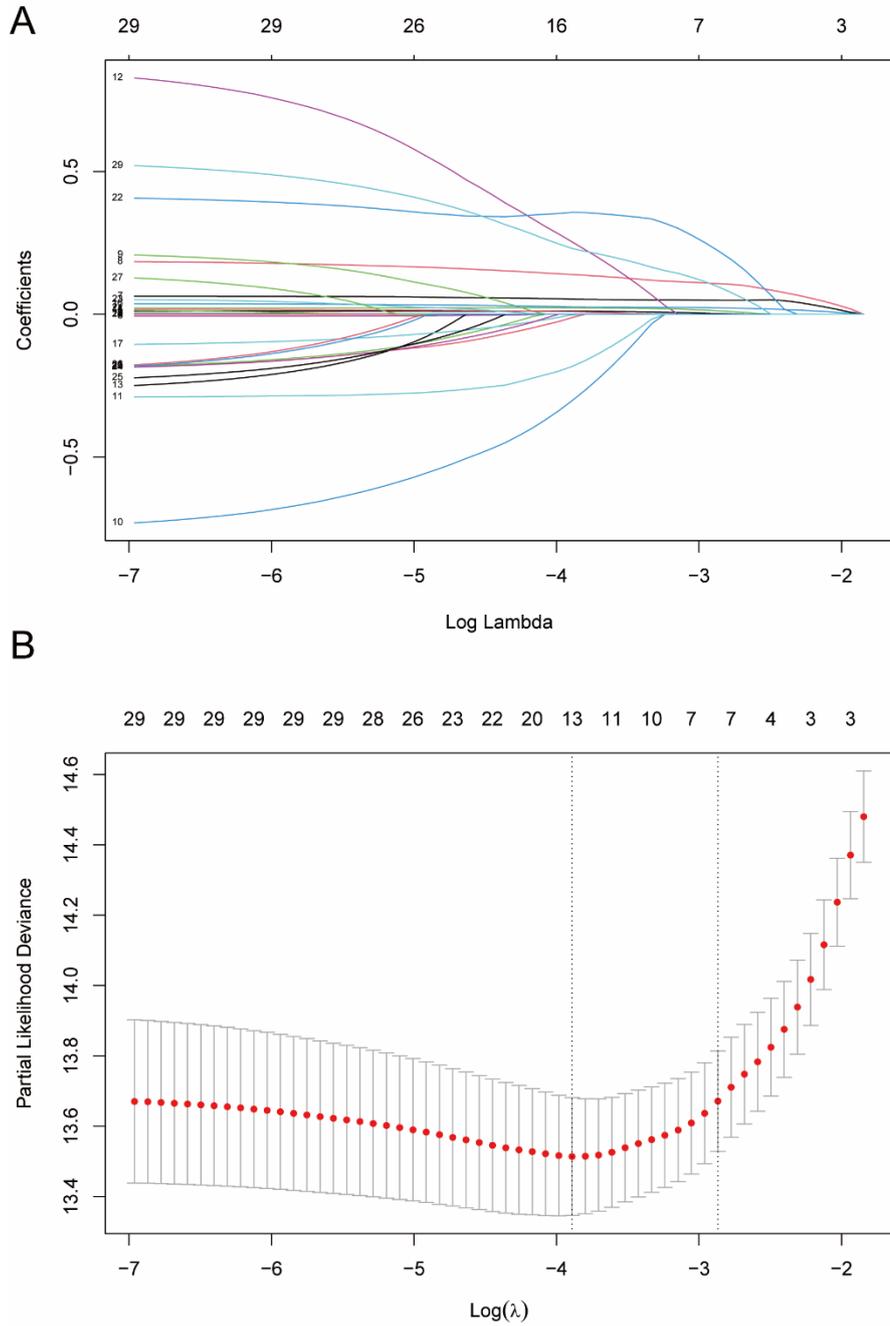
cell, CRRT – continuous renal replacement therapy.

**Supplementary Table SV.** Sensitivity analysis of patients after excluded those with end-stage renal disease and liver cirrhosis

Variables	Model 1		Model 2		Model 3	
	HR (95% CI)	<i>P</i> -value	HR (95% CI)	<i>P</i> -value	HR (95% CI)	<i>P</i> -value
90-day mortality						
Continuous	1.05 (1.03~1.06)	< 0.001	1.04 (1.02~1.06)	< 0.001	1.03 (1~1.05)	0.024
Quartile						
Q1	1 (ref)		1 (ref)		1 (ref)	
Q2	4.5 (1.54~13.19)	0.006	4.23 (1.44~12.38)	0.009	3.61 (1.21~10.73)	0.021
Q3	6.23 (2.18~17.86)	0.001	5.66 (1.97~16.26)	0.001	4.01 (1.37~11.72)	0.011
Q4	10.67 (3.76~30.29)	< 0.001	8.28 (2.88~23.75)	< 0.001	5.20 (1.67~16.21)	0.004
<i>P</i> for trend		< 0.001		< 0.001		0.008
365-day mortality						
Continuous	1.04 (1.03~1.06)	< 0.001	1.04 (1.02~1.05)	< 0.001	1.02 (1.00~1.05)	0.048
Quartile						
Q1	1 (ref)		1 (ref)		1 (ref)	
Q2	2.71 (1.27~5.79)	0.01	2.58 (1.21~5.52)	0.014	2.28 (1.05~4.93)	0.037
Q3	3.6 (1.72~7.54)	0.001	3.32 (1.58~6.99)	0.002	2.44 (1.14~5.25)	0.022
Q4	5.85 (2.81~12.18)	< 0.001	4.80 (2.27~10.15)	< 0.001	2.91 (1.25~6.79)	0.013
<i>P</i> for trend		< 0.001		< 0.001		0.028

Model 1: adjusted for age, gender. Model 2: adjusted for Model 1 plus obesity, diabetes, AKI. Model 3: adjusted for Model 2 plus SOFA, CCI, WBC, creatinine,

total bilirubin, vasopressor, CRRT. AKI – acute kidney injury, SOFA – sequential organ failure assessment, CCI – Charlson comorbidity index, WBC – white blood cell, CRRT – continuous renal replacement therapy.



**Supplementary Figure S1.** Clinical features were selected using LASSO regression with cross-validation. **A** – Selection process of prognostic variables of AP by least absolute shrinkage and selection operator regression. **B** – Selection process of the value of lambda by cross-validation