

Supplementary Material

Salem AlKaabi et al. A Clinical Risk Score to Predict in-hospital Mortality in Critically Ill Patients with COVID-19: A Retrospective Cohort Study

eTable 1. Comparison of patients who were included in the study analyses vs those who were excluded.

eTable 2. Univariate competing risk models on candidate predictors.

eFigure 1. Feature selection using the least absolute shrinkage and selection operator (LASSO) competing risk survival model.

eFigure 2. Mortality curves according to risk factors retained in LASSO.

eTable 1. Comparison of patients who were included in the study analyses vs those who were excluded.

Variables	Included 1,542 (90.97%)	Excluded 153 (9.03%)	P-value†
Age	48.94 (±12.66)	48.63 (±14.42)	0.656
Gender, n (%)			
Female	221 (14.33%)	25 (16.34%)	0.581
Male	1,321 (85.67%)	128 (83.66%)	
Diabetes, n (%)			
No	874 (56.68%)	77 (50.33%)	0.154
Yes	668 (43.32%)	76 (49.67%)	
Hypertension, n (%)			
No	854 (55.38%)	86 (56.21%)	0.912
Yes	688 (44.62%)	67 (43.79%)	
Respiratory disease, n (%)			
No	1,361 (88.26%)	134 (87.58%)	0.907
Yes	181 (11.74%)	19 (12.42%)	
Cardiovascular disease, n (%)			
No	1,053 (68.29%)	103 (67.32%)	0.877
Yes	489 (31.71%)	50 (32.68%)	
Chronic kidney disease, n (%)			
No	1,397 (90.60%)	140 (91.50%)	0.824
Yes	145 (9.40%)	13 (8.50%)	
Cancer, n (%)			
No	1,479 (95.91%)	147 (96.08%)	1.000
Yes	63 (4.09%)	6 (3.92%)	
Liver disease, n (%)			
No	1,437 (93.19%)	143 (93.46%)	1.000
Yes	105 (6.81%)	10 (6.54%)	
Coexisting conditions, n (%)			
0	498 (32.30%)	56 (36.60%)	0.05
1	403 (26.13%)	26 (16.99%)	
≥ 2	641 (41.57%)	71 (46.41%)	
Systolic blood pressure, Mean (±SD)	126.16 (±17.37)	124.86 (±18.19)	0.137
Missing	0 (0%)	5 (3.27%)	
Diastolic blood pressure, Mean (±SD)	75.54 (±12.12)	73.66 (±9.86)	0.070
Missing	0 (0%)	5 (3.27%)	
Respiratory rate, Mean (±SD)	23.26 (±6.70)	22.32 (±6.62)	0.097
Glasgow Coma Scale, Mean (±SD)	13.96 (±3.25)	13.92 (±3.25)	0.635
Missing	0 (0%)	28 (18.30%)	
Glasgow Coma Scale, n (%)			
Mild	1,391 (90.21%)	112 (73.20%)	0.639
Moderate	21 (1.36%)	3 (1.96%)	
Severe	130 (8.43%)	10 (6.54%)	
Missing	0 (0.00%)	28 (18.30%)	
Chloride, Mean (±SD)	99.25 (±4.50)	99.42 (±4.97)	0.675
Missing	0 (0%)	61 (39.87%)	
Bicarbonates, Mean (±SD)	22.80 (±3.28)	22.62 (±3.54)	0.210
Missing	0 (0%)	61 (39.87%)	
Hemoglobin, Mean (±SD)	131.90 (±18.24)	130.04 (±21.45)	0.814
Missing	0 (0%)	68 (44.44%)	
Monocytes percent, Mean (±SD)	6.93 (±3.67)	6.63 (±3.31)	0.474
Missing	0 (0%)	69 (45.10%)	
Neutrophil percent, Mean (±SD)	73.04 (±13.28)	72.58 (±14.16)	0.865
Missing	0 (0%)	69 (45.10%)	

eTable 1. Comparison of patients who were included in the study analyses vs those who were excluded.

Variables	Included 1,542 (90.97%)	Excluded 153 (9.03%)	P-value [†]
Platelets count, Mean (±SD)	263.57 (±107.94)	257.51 (±118.38)	0.359
Missing	0 (0%)	69 (45.10%)	
Potassium, Mean (±SD)	4.05 (±0.55)	4.05 (±0.55)	0.980
Missing	0 (0%)	61 (39.87%)	
Red blood cell distribution width, Mean (±SD)	13.49 (±1.60)	13.74 (±2.27)	0.829
Missing	0 (0%)	67 (43.79%)	
White blood cells, Mean (±SD)	7.89 (±3.92)	9.21 (±6.08)	0.257
Missing	0 (0%)	68 (44.44%)	
Creatinine, Mean (±SD)	97.76 (±111.80)	95.09 (±71.56)	0.300
Missing	0 (0%)	59 (38.56%)	
Lactate dehydrogenase, Mean (±SD)	409.32 (±223.16)	400.00 (±125.96)	0.431
Missing	0 (0%)	121 (79.08%)	
Ferritin, Mean (±SD)	1209.37 (±1374.60)	1031.91 (±996.80)	0.400
Missing	0 (0%)	116 (75.82%)	
C-reactive protein level, Mean (±SD)	102.13 (±94.00)	88.42 (±94.52)	0.057
Missing	0 (0%)	76 (49.67%)	
Sodium, Mean (±SD)	136.98 (±4.36)	136.87 (±4.76)	0.446
Missing	0 (0%)	61 (39.87%)	
Hematocrit, Mean (±SD)	0.39 (±0.05)	0.39 (±0.06)	0.462
Missing	0 (0%)	67 (43.79%)	
Red blood cells, Mean (±SD)	4.75 (±0.71)	4.64 (±0.73)	0.542
Missing	0 (0%)	67 (43.79%)	
Lymphocytes count, Mean (±SD)	1.28 (±0.71)	1.38 (±0.90)	0.440
Missing	0 (0%)	69 (45.10%)	
Neutrophils count, Mean (±SD)	6.00 (±3.77)	6.94 (±4.87)	0.376
Missing	0 (0%)	69 (45.10%)	
Monocyte count, Mean (±SD)	0.51 (±0.36)	0.54 (±0.33)	0.514
Missing	0 (0%)	69 (45.10%)	
Lymphocyte percent, Mean (±SD)	18.76 (±10.74)	18.72 (±11.70)	0.824
Missing	0 (0%)	69 (45.10%)	
Neutrophil-lymphocyte percent ratio, Mean (±SD)	6.82 (±9.46)	8.09 (±11.18)	0.828
Missing	0 (0%)	69 (45.10%)	
Neutrophil-lymphocyte count ratio, Mean (±SD)	6.81 (±9.39)	8.09 (±11.18)	0.830
Missing	0 (0%)	69 (45.10%)	

[†]Continuous variables were compared using the t-test Wilcoxon-rank-sum test, while discrete variables were compared using the Chi-square test Fisher's exact test.

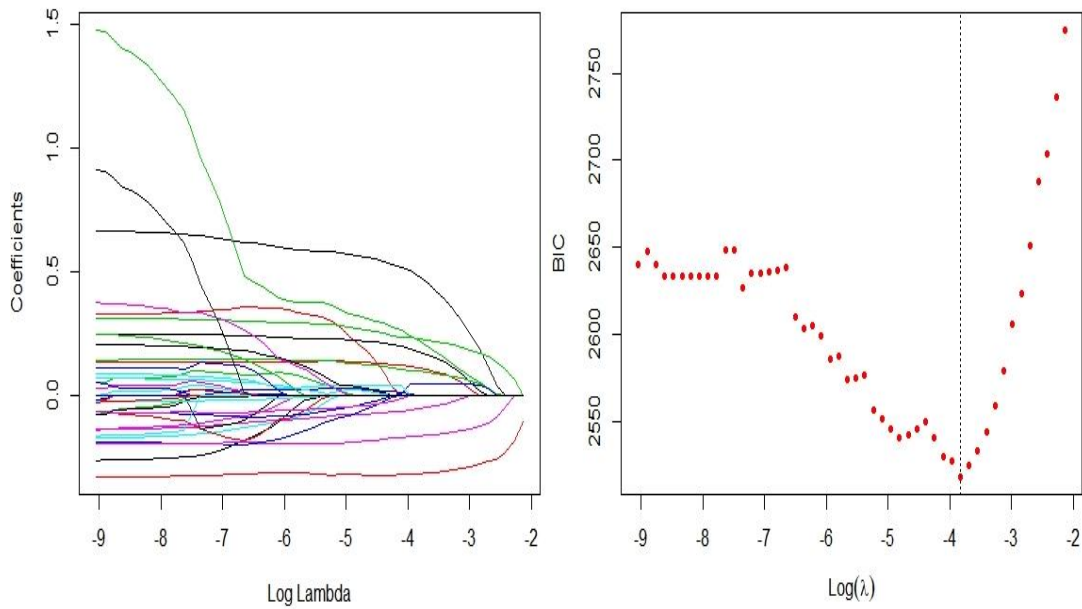
eTable 2. Univariate competing risk models on candidate predictors.

Variable	HR (95% CI)	P-value	AUC (95% CI)
Age	1.83 (1.61, 2.09)	<.001	67.22 (63.11, 71.33)
Male sex	1.02 (0.68, 1.53)	0.92	49.95 (47.20, 52.71)
Diabetes	1.69 (1.28, 2.24)	<.001	56.86 (52.91, 60.80)
Hypertension	1.70 (1.28, 2.26)	<.001	56.31 (52.37, 60.24)
Respiratory disease	1.32 (0.90, 1.94)	0.16	50.82 (48.10, 53.54)
Cardiovascular disease	2.10 (1.58, 2.77)	<.001	58.02 (54.09, 61.95)
Chronic kidney disease	2.36 (1.65, 3.37)	<.001	54.85 (51.87, 57.82)
Cancer	1.72 (0.97, 3.05)	0.062	51.45 (49.51, 53.39)
Liver disease	1.65 (1.07, 2.55)	0.023	51.40 (49.06, 53.73)
Chloride	0.94 (0.78, 1.14)	0.55	52.46 (47.39, 57.52)
Bicarbonate	0.63 (0.55, 0.72)	<.001	67.62 (62.91, 72.33)
Hemoglobin	0.74 (0.65, 0.83)	<.001	59.28 (54.81, 63.76)
Monocytes percentage	0.42 (0.29, 0.61)	<.001	73.55 (69.54, 77.56)
Neutrophil percentage	3.31 (2.57, 4.25)	<.001	76.94 (73.36, 80.51)
Platelets	0.77 (0.65, 0.93)	0.0052	56.86 (52.15, 61.58)
Potassium	1.34 (1.15, 1.57)	<.001	54.51 (49.45, 59.58)
Red blood cell width	1.25 (1.14, 1.38)	<.001	60.02 (55.74, 64.30)
White blood cell	1.55 (1.44, 1.66)	<.001	66.32 (61.80, 70.84)
Creatinine	1.21 (1.12, 1.32)	<.001	61.37 (56.39, 66.34)
Lactate dehydrogenase	1.34 (1.18, 1.51)	<.001	79.00 (75.62, 82.38)
Ferritin	1.26 (1.16, 1.37)	<.001	65.05 (60.92, 69.18)
Systolic blood pressure	0.95 (0.79, 1.13)	0.53	53.33 (48.28, 58.39)
Diastolic blood pressure	0.73 (0.62, 0.85)	<.001	58.82 (53.97, 63.67)
Respiratory rate	1.49 (1.35, 1.64)	<.001	69.45 (65.44, 73.47)
Glasgow coma scale	0.57 (0.52, 0.62)	<.001	67.89 (64.10, 71.68)
C-reactive protein	1.74 (1.55, 1.96)	<.001	71.21 (67.13, 75.30)
Neutrophil-lymphocyte ratio	1.31 (1.25, 1.38)	<.001	75.67 (72.06, 79.27)
Neutrophil-lymphocyte percentage ratio	1.31 (1.25, 1.38)	<.001	75.67 (72.07, 79.28)
Minimum SpO ₂	0.68 (0.63, 0.74)	<.001	75.82 (71.75, 79.89)
Sodium	1.00 (0.82, 1.22)	0.99	46.84 (41.81, 51.88)
Hematocrit	0.77 (0.67, 0.88)	<.001	57.83 (53.24, 62.43)
Red blood cell	0.76 (0.65, 0.88)	<.001	58.08 (53.38, 62.78)
Lymphocytes count	0.44 (0.33, 0.57)	<.001	68.28 (64.11, 72.44)
Neutrophils count	1.61 (1.49, 1.73)	<.001	70.90 (66.79, 75.02)
Monocytes count	0.94 (0.58, 1.51)	0.79	60.74 (55.92, 65.57)
Lymphocytes percentage	0.29 (0.23, 0.38)	<.001	75.40 (71.78, 79.01)

Abbreviations: HR, hazard ratios; CI, confidence interval; AUC, area under the receiver operating characteristics curve; SpO₂, peripheral capillary oxygen saturation.

The predictors were scaled using z-score transformation, and hazard ratios should be interpreted as 1 SD change in the values of the parameters.

eFigure 1. Feature selection using the least absolute shrinkage and selection operator (LASSO) competing risk survival model.



eFigure 2. Mortality curves according to risk factors retained in LASSO

