

Supplementary Material

Table S1 reports the severity risk factors identified in this study using a logistic regression model included elderly age, higher D-Dimer and LDH levels.

Table S2 reports the mortality risk factors identified in this study using a logistic regression model included elderly age, higher SII and APTT levels.

Table S3 reports the analysis of all AUCs for the single laboratory parameters and models predicting performance for disease severity.

Table S4 reports the analysis of all AUCs for the single laboratory parameters and models predicting performance for mortality.

Table S5 reports the differences of the routine laboratory parameters collected on admission among the subgroups of comorbidities, discharged and non-discharged COVID-19 patients.

Table S1. The severity risk factors identified in this study using a logistic regression model included elderly age, higher D-Dimer and LDH levels.

	Univariable OR (95% CI)	p-value	Multivariable OR (95% CI)	p-value
Age	1.04 (1.0-1.07)	0.05	1.05 (1.03-1.07)	<0.0001
WBC (x 10 ⁹ /L)	1.0 (0.99-1.00)	0.62	-	
LYM (x 10 ⁹ /L)	1.17 (0.78-1.74)	0.44	-	
PLT (x 10 ⁹ /L)	1.06 (0.77-1.48)	0.71	-	
HGB (g/dL)	0.99 (0.98-1.01)	0.39	-	
NEU (x 10 ⁹ /L)	0.98 (0.77-1.24)	0.86	-	
NLR	0.89 (0.57-1.42)	0.64	-	
PLR	1.14 (0.92-1.42)	0.23	-	
SII	1.0 (0.99-1.01)	0.58	-	
ESR (mm/h)	1.01 (0.98-1.03)	0.41	-	
APTT (sec)	1.03 (0.95-1.11)	0.46	-	
D-Dimer (ng/mL)	1.0 (1.0-1.001)	0.05	1.001 (1.0-1.001)	<0.0001
CRP (mg/L)	1.0 (0.99-1.01)	0.87	-	
ALT (U/L)	0.99 (0.97-1.02)	0.54	-	
AST (U/L)	0.99 (0.97-1.03)	0.97	-	
Total bilirubin (mg/dL)	1.07 (0.28-4.01)	0.93	-	
LDH (U/L)	1.0 (1.0-1.01)	0.028	1.003 (1.001-1.01)	<0.0001
CK (U/L)	1.0 (0.99-1.0)	0.75	-	
Serum Creatinine (mg/dL)	0.98 (0.65-1.5)	0.94	-	
Blood Urea Nitrogen (mg/dL)	0.99 (0.99-1.01)	0.68	-	
Ferritin (ug/L)	1.0 (0.99-1.01)	0.73	-	

P-value: derived from Mann-Whitney U-test; Significant differences are shown in bold (p < 0.0001).

Table S2. Risk factors associated with death in COVID-19 patients

	Univariable OR (95% CI)	p-value	Multivariable OR (95% CI)	p-value
Age	1.06 (1.02-1.10)	0.004	1.05 (1.03-1.07)	<0.0001
WBC (x 10 ⁹ /L)	1.43 (0.89-2.29)	0.131	-	
LYM (x 10 ⁹ /L)	1.0 (0.63-1.59)	0.988	-	
PLT (x 10 ⁹ /L)	0.99 (0.98-1.0)	0.212	-	
HGB (g/dL)	0.84 (0.67-1.07)	0.158	-	
NEU (x 10 ⁹ /L)	1.26 (0.68-2.33)	0.461	-	
NLR	1.11 (0.86-1.42)	0.434	-	
PLR	1.01 (1.0-1.02)	0.004	1.0 (0.99-1.0)	0.854
SII	0.99 (0.99-1.0)	0.008	1.0 (1.0-1.001)	<0.0001
ESR (mm/h)	0.99 (0.97-1.02)	0.542	-	
APTT (sec)	1.08 (0.99-1.16)	0.062	1.05 (1.01-1.09)	0.02
D-Dimer (ng/mL)	1.0 (1.0-1.0)	0.898	-	
CRP (mg/L)	1.0 (0.99-1.01)	0.350	-	
ALT (U/L)	0.98 (0.96-1.01)	0.117	-	
AST (U/L)	1.02 (0.98-1.05)	0.298	-	
Total bilirubin (mg/dL)	1.49 (0.39-5.77)	0.563	-	
LDH (U/L)	1.0 (0.98-1.0)	0.918	-	
CK (U/L)	1.0 (0.99-1.0)	0.882	-	
Serum Creatinine (mg/dL)	2.86 (0.52-15.79)	0.227	-	
Blood Urea Nitrogen (mg/dL)	0.98 (0.96-1.01)	0.163	-	
Ferritin (ug/L)	1.0 (0.99-1.0)	0.836	-	

P-value: derived from Mann-Whitney U-test; Significant differences are shown in bold (p < 0.0001).

Table S3. Area Under the Curves for the severity of disease.

Parameters	AUC (95% CI)	p-value
Age	0.77 (0.71-0.84)	< 0.0001
WBC	0.74 (0.66-0.83)	< 0.0001
NEU	0.80 (0.73-0.88)	< 0.0001
NLR	0.84 (0.77-0.9)	< 0.0001
PLR	0.68 (0.58-0.77)	< 0.0001
SII	0.78 (0.71-0.86)	< 0.0001
ESR	0.68 (0.59-0.76)	< 0.0001
DDimer	0.81 (0.74-0.88)	< 0.0001
CRP	0.75 (0.67-0.84)	< 0.0001
AST	0.57 (0.47-0.67)	0.14
TOTAL bilirubin	0.51 (0.41-0.61)	0.86
LDH	0.79 (0.71-0.87)	< 0.0001
CK	0.51 (0.41-0.61)	0.81
Creatinine	0.57 (0.46-0.67)	0.17
Urea	0.75 (0.67-0.83)	< 0.0001
Ferritin	0.78 (0.71-0.85)	< 0.0001
ALT	0.51 (0.43-0.59)	0.75
APTT	0.51 (0.42-0.59)	0.82
HGB	0.63 (0.55-0.71)	0.001
PLT	0.58 (0.49-0.66)	0.067
LYM	0.74 (0.67-0.82)	< 0.0001
Model1 (Age, D-Dimer, LDH)	0.84 (0.78-0.89)	< 0.0001
Model2 (D-Dimer, APTT, CK, Total bilirubin, Creatinine, BUN)	0.69 (0.58-0.79)	0.005
Model3 (D-Dimer, Creatinine, BUN)	0.85 (0.79-0.91)	< 0.0001

P-value: derived from Mann-Whitney U-test; Significant differences are shown in bold (p < 0.0001).

Table S4. Area Under the Curves for mortality

Parameters	AUC (95% CI)	p-value
Age	0.79 (0.74-0.85)	< 0.0001
WBC	0.74 (0.65-0.83)	< 0.0001
NEU	0.79 (0.73-0.87)	< 0.0001
NLR	0.85 (0.79-0.91)	< 0.0001
PLR	0.69 (0.61-0.78)	< 0.0001
SII	0.8 (0.74-0.87)	< 0.0001
ESR	0.63 (0.54-0.71)	0.007
DDimer	0.77 (0.69-0.85)	< 0.0001
CRP	0.76 (0.69-0.84)	< 0.0001
AST	0.56 (0.47-0.66)	0.175
TOTAL bilirubin	0.59 (0.5-0.68)	0.055
LDH	0.72 (0.63-0.81)	< 0.0001
CK	0.56 (0.47-0.65)	0.203
Creatinine	0.64 (0.54-0.73)	0.004
Urea	0.76 (0.68-0.85)	< 0.0001
Ferritin	0.73 (0.65-0.8)	< 0.0001
ALT	0.53 (0.45-0.61)	0.04
APTT	0.52 (0.43-0.6)	0.043
HGB	0.65 (0.57-0.73)	0.04
PLT	0.56 (0.47-0.65)	0.044
LYM	0.72 (0.65-0.79)	< 0.0001
Model4 (Age, SII, APTT)	0.83 (0.77-0.88)	< 0.0001
Model5 (D-Dimer, APTT, CK, Total bilirubin, Creatinine, BUN)	0.81 (0.74-0.89)	< 0.0001
Model6 (D-Dimer, BUN)	0.82 (0.76-0.88)	< 0.0001
Model7 (CRP, Ferritin, NEU, NLR, SII, PLR)	0.86 (0.81-0.91)	< 0.0001
Model8 (NEU, NLR, SII, PLR)	0.85 (0.8-0.9)	< 0.0001

P-value: derived from Mann-Whitney U-test; Significant differences are shown in bold (p < 0.0001).

Table S5. Differences between levels of laboratory variables at admission within the subgroups of comorbidities, survived vs. deceased COVID-19 patients.

Deceased (Yes, No)																		P value										
Hypertension		Diabetes		COPD		Cardiovascular diseases		Liver diseases		Renal diseases		Obesity		Cancer		Cerebrovascular diseases		Hypertension	Diabetes	COPD	Cardio	Liver	Renal	Obesity	Cancer	Cerebral vascular <0.001		
Age (years, Mean ± S.D.)	No (N=89) 60.6±15.4	Yes (n=51) 68.9±0.9	No (n=30) 58.1±2.3	Yes (n=32) 67.0±11.9	No (n=29) 61.9±3.4	Yes (n=32) 66.7±12.1	No (n=10) 90.9±1.1	Yes (n=41) 46.4±3.6	No (n=11) 67.1±7.3	Yes (n=15) 71.9±0.8	No (n=39) 54±15.3	Yes (n=17) 67.5±13.7	No (n=11) 60.7±1.9	Yes (n=11) 62.9±1.9	No (n=11) 72.5±7.7	Yes (n=18) 69.3±13.9	0.0003	<0.0001	0.0001	<0.0001	0.0582	0.0007	>0.9999	0.1751	0.2111	0.0214		
Male	54 (60.7%)	30 (58.8%)	21 (70%)	16 (50%)	23 (71.9%)	18 (62.1%)	20 (66.7%)	24 (58.5%)	8 (80%)	6 (66.7%)	7 (63.6%)	24 (61.5%)	5 (33.3%)	11 (64.7%)	8 (72.7%)	7 (63.6%)	11 (61.1%)	0.8591	0.1275	0.5856	0.6216	0.6285	0.4527	0.0759	>0.9999	>0.9999		
Female	35 (39.3%)	21 (41.2%)	9 (30%)	16 (50%)	9 (28.1%)	11 (37.9%)	10 (33.3%)	17 (41.5%)	2 (2%)	3 (33.3%)	4 (36.4%)	8 (53.3%)	15 (38.5%)	10 (66.7%)	6 (35.3%)	3 (27.3%)	4 (36.4%)	7 (38.9%)									0.6021	0.4180
Laboratory parameters																												
WBC (x 10 ⁹ /L)	7.3±4.2	13.3±9.8	8.3±5.2	14.3±9.9	8.5±5.7	14.4±8.9	8.8±4.9	14.2±10.0	8.3±6.8	8.6±7.7	16.2±12.6	7±4.1	13.8±6.6	10.5±6.8	11.9±4.6	6.7±4.4	14.8±12.3	<0.0001	0.0017	0.0080	0.02	0.2224	0.0237	<0.0001	0.2211	0.0214		
LYM (x 10 ⁹ /L)	1.7±1.4	1.3±1.3	1.9±1.8	1.3±0.7	1.6±1.0	1.5±1.7	1.8±1.6	1.3±1.5	2.1±1.9	0.9±0.8	1.4±0.7	1.1±0.6	1.7±1.4	1±0.5	2.0±2.0	1.3±0.8	1.3±0.6	1.1±0.8	0.0003	0.0136	0.0242	0.0261	0.0789	0.0893	0.0039	0.2300	0.2247	
PLT (x 10 ⁹ /L)	260.3±111.8	249.3±128.2	264.9±101.6	264.3±120.1	270.1±140.1	257.1±140.3	266.3±114.8	235.2±125.8	182.1±81.7	229.9±169.7	239.5±87.6	311.1±157.6	245.8±82.3	265.3±135.9	263.0±148.9	329.2±179.5	250.7±93.6	228.4±143.1	0.3210	0.6318	0.6182	0.2069	0.6038	0.1679	0.9886	0.4372	0.3687	
HGB (g/dL)	13.1±1.9	12.2±2.6	13.3±2.3	12.3±2.3	13.1±2.5	11.9±2.6	12.7±2.4	12.1±2.4	12.9±1.6	10.3±3.6	12.6±2.6	11.1±3.0	13.9±2	11.6±2.7	12.1±2.7	12.1±3.8	12.6±0.9	12.4±2.6	0.0337	0.0336	0.0877	0.3645	0.0531	0.1935	0.0008	0.6024	0.6027	
NEU (x 10 ⁹ /L)	5.1±3.8	1.1±8.9	5.9±4.8	12.0±9.0	8.1±12.0	6.5±4.7	11.9±9.1	11.9±20.3	14.8±13.8	6.3±6.9	13.8±1.3	4.9±3.9	11.6±5.4	7.7±6.3	9.5±3.4	4.7±4.6	12.5±11.3	<0.0001	0.0001	0.0058	0.0022	0.2775	0.0077	<0.0001	0.1755	0.0045		
NLR	4.2±4.3	11.8±9.4	4.5±4.9	11.2±8.1	6.2±10.3	10.2±6.8	5.4±5.6	14.4±13.3	9.9±17.4	2.5±2.3	4.9±5.9	12.9±6.8	3.9±4.1	13.8±1.3	5.6±5.1	9.3±4.8	5±7.3	14.7±12.1	<0.0001	0.0007	<0.0001	0.0005	0.0005	0.0005	<0.0001	0.0735	0.0125	
PLR	199.3±127.9	276.9±171.9	186.5±121.4	258.6±148.6	189.4±100.1	276.7±195.1	195.2±98.0	265.1±154.1	128.3±80.8	359.5±231.3	191.8±97.0	322.1±188.2	181±91.4	289.3±172.2	167.9±91.5	316.3±218.8	220.1±115.1	264.1±175.8	0.0025	0.0246	0.0864	0.0133	0.0473	0.0193	0.0326	0.5501		
SII	1193.3±1621.9	2873.1±2435.4	1374.2±2039.3	2946.8±2360.9	1530.9±2086.5	2791.3±2460.7	1417.2±1647.9	3109.8±2611.4	1138±1803.5	3834.4±2607.5	1597.8±2798.6	3969.4±2956.8	1078.7±1644.7	3694.7±3045.9	1573.9±1841.7	3241.9±2895.9	1412.5±2446.1	3350.4±5003.9	<0.0001	0.0001	0.0104	0.0018	0.0172	0.0030	<0.0001	0.0417	0.0682	
ESR (mm/h)	61.4±10.4	60.7±28.9	52.3±32.7	68.6±26.8	50.9±34.3	66.2±25.5	80.9±183.1	59.2±28.5	46.9±35.1	59.2±44.4	46.7±24.5	64±29.1	51.8±32.8	47.9±34.6	59.9±26.4	43.8±30.8	63.5±31.5	0.0319	0.0120	0.0796	0.1197	0.4839	0.1443	0.0883	0.2582	0.0893		
APTT (sec)	30.2±4.9	30.2±7.8	29.9±6.3	28.8±6.3	31.2±4.1	30.1±9.7	29.6±6.0	30.8±9.7	31.7±3.0	45.1±31.0	29.1±4.2	30.9±5.9	29.9±5.5	31.4±6.0	26.9±9.6	31.1±4.3	29.4±3.5	30.9±6.0	0.0947	0.6978	0.0849	0.5771	>0.9999	0.1962	0.2298	0.1696		
D-Dimer (ng/mL)	754.1±2220.2	2480.9±7057.4	1370.0±3704.1	2018.2±5527.2	1132.3±3343.4	1775.1±6427.7	846.9±1685.9	3472.0±9083.5	779.4±1053.3	3244.6±5331.3	827.4±1069.3	808.5±1000.6	518.9±1381.8	1436.6±1452.9	1865.1±4542.9	1584.6±3980.9	722.7±820.4	3246.7±7228.7	0.0004	0.0051	0.0786	0.0578	0.2037	0.3914	<0.0001	0.7020	0.2758	
CRP (mg/L)	40.2±53.9	99.2±75.9	39.6±54.6	108.8±87.9	45.8±86.2	103.8±82.7	57.0±73.6	87.5±49.9	59.7±88.2	96.4±79.1	23.8±26.5	101.5±92.5	51.4±58.7	116.1±91.1	53.6±108.5	84.3±75.1	70.3±79.3	80.6±54	<0.0001	0.0003	<0.0001	0.0132	0.0764	0.0016	0.0031	0.0427	0.3869	
ALT (U/L)	44.3±39.9	35.9±26.2	38.1±21.8	34.5±24.4	43.2±57.1	40.0±32.6	32.4±20.3	35.1±24.8	114.1±226.2	43.7±58.5	29.5±21.7	29.9±15.9	43±25.9	32.1±13.9	47.5±56.5	21.9±16.6	34.7±24.5	41.3±33.2	0.1375	0.2723	0.5733	0.8373	0.2184	0.6368	0.2357	0.1568	0.6987	
AST (U/L)	43.1±33.9	44.1±51.1	37.1±19.6	50.5±36.6	42.8±43.4	44.6±32.2	37.9±33.5	43.2±29.9	118.3±265.1	197.7±487	35.6±15.9	41.8±22.7	37.6±19.1	51.5±24.9	39.9±37.9	27.8±24.9	50.4±51.6	46.4±35.1	0.8199	0.2601	0.4750	0.50	0.9863	0.5826	0.0570	0.0793	0.8509	
Total bilirubin (mg/dL)	0.6±0.4	1.3±4.5	0.6±0.5	1.7±5.6	0.6±0.4	1.8±5.8	0.6±0.3	0.7±0.5	1.4±3.5	0.5±0.2	2.9±8.4	0.6±0.4	2.7±8.1	0.6±0.5	3.7±9.4	0.5±0.3	2.4±7.4	0.0933	0.0837	0.2333	0.							