

Stratification of COVID-19 severity using SeptiCyte RAPID, a novel host immune response test

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Supplementary Tables

Supplementary Table S1: Patient comorbidities and treatments

Characteristic	Stratum	N (%)
Number of comorbidities	5	1 (1.0%)
	4	5 (5.3%)
	3	13 (13.8%)
	2	30 (31.9 %)
	1	23 (24.5.0%)
	0	22 (23.4 %)
Types of comorbidities	None listed	22 (23.4%)
	Hypertension	42 (44.7%)
	Diabetes	32 (34.0 %)
	Obesity (BMI \geq 30)*	22 (23.4%)
	Pulmonary	15 (16.0%)
	Renal	10 (10.6%)
	Cardiovascular	13 (13.8 %)
	Cancer	10 (10.6%)
	Dyslipidemia	6 (6.4 %)
	Hypothyroidism	5 (5.3%)
Treatments	ICU	30 (31.9%)
	Corticosteroids	51 (54.3%)
	Tocilizumab	24 (25.5 %)
	Oxygen	57 (60.6%)
	Intubation	7 (7.4%)
	ECMO	3 (3.2%)
	Antibiotics	36 (38.3%)

*BMI available for only 46 patients

Supplementary Table S2 : Distribution of SARS-CoV-2 (+) patients across COVID-19 severity categories and hospital locations. COVID-19 severity assessments were made on the basis of chest CT scans, conducted within 24 hours of SeptiCyt RAPID measurement. Range is specified in [] square brackets, and percentage is specified in () parentheses. The median values for age and the median time between onset of symptoms and SeptiCyt result are reported for those patients with CT scan results.

	Emergency Department (Fig 1a) (n=67 total; 49 with CT scan results)					ICU (Fig 1b)	Conventional Unit,Viremia (Fig. 1c)
Follow-up	Discharged (< 24 hours in ED)	Conventional Hospitalization	Delayed ICU admission	Immediate ICU admission	Deceased in ED		
n (total) = 94	25	33	4	3	2	23	4
n (with CT scan result)	12	30	4	2	1	15	4
F/M (with CT scan result)	6/6	13/17	2/2	0/2	1/0	6/9	1/3
Median age, years	58 [20 – 84]	71 [23 – 96]	66 [63 – 66]	77 [76 – 78]	85	59 [27 – 78]	57 [38 – 67]
Median time between onset of symptoms and SeptiCyt result, days (symptomatic patients)	7 (n=11) [1 – 12]	7 (n=28) [0 – 30]	6 (n=4) [4 – 9]	8.5 (n=2) [7 – 10]	NA	10 [1 – 24]	9 [9 – 11]
Radiologic injury, n (%)							
Absence (0%)	5 (20%)	1 (3%)	0	0	0	0	0

	Emergency Department (Fig 1a) (n=67 total; 49 with CT scan results)					ICU (Fig 1b)	Conventional Unit,Viremia (Fig. 1c)
Follow-up	Discharged (< 24 hours in ED)	Conventional Hospitalization	Delayed ICU admission	Immediate ICU admission	Deceased in ED		
Mild (present but <10 %)	1 (4%)	8 (24%)	0	0	0	0	1 (25%)
Moderate [10 – 25 %]	4 (16%)	8 (24%)	1 (25%)	0	1 (50%)	2 (8.7%)	1 (25%)
Extensive (25 - 50 %)	1 (4%)	11 (33%)	1 (25%)	1 (33.3%)	0	4 (17%)	2 (50%)
Severe [50 – 75 %]	0	1 (3%)	1 (25%)	1 (33.3%)	0	6 (26%)	0
Critical (> 75 %)	0	0	0	0	0	3 (13.1%)	0
Not specific	1 (4%)	1 (3%)	1 (25%)	0	0	0	0
Not performed	13 (52%)	3 (9.1%)	0	1 (33.3%)	1 (50%)	8 (34.8%)	0

Supplementary Table S3: Logistic Regression models (see Figures. 4A, 4B in main text). A complete permutation analysis of different logistic combinations of up to six variables (SeptiScore, monocytes, CD16-monocytes, D-dimer, lactate and CRP) was conducted, resulting in 63 independent logistic regression models. The models were used to discriminate Critical + Severe in ICU (n=13) vs. Moderate + Mild not in ICU (n = 24) and their AUC values were calculated. Interquartile ranges for AUC were obtained by resampling from 100 replicate datasets. Missing values in the line data were imputed using Amelia, a multiple imputation algorithm [Reference 15 in main text]. Multiple imputation is claimed to have reduced bias and increased accuracy over point-imputation methods such as "mean" or "median" imputation [Reference 15 in main text]. Abbreviations: CRP, C-reactive protein; Mono, monocytes; Mono.CD16, CD16-monocytes.

Model	variables	MEAN	MEDIAN	25%	75%
1	CRP	0.867	0.871	0.860	0.890
2	D-dimer	0.630	0.640	0.576	0.679
3	Lactate	0.668	0.680	0.607	0.729
4	Mono	0.725	0.722	0.703	0.748
5	Mono.CD16	0.750	0.752	0.698	0.791
6	D-dimer + Lactate	0.663	0.674	0.613	0.724
7	Lactate + Mono	0.739	0.742	0.716	0.761
8	D-dimer + Lactate + Mono	0.767	0.765	0.739	0.792
9	Mono + Mono.CD16	0.768	0.758	0.734	0.807
10	D-dimer + Mono	0.769	0.769	0.742	0.792
11	Lactate + Mono.CD16	0.779	0.778	0.730	0.838
12	Lactate + Mono + Mono.CD16	0.792	0.780	0.745	0.837
13	D-dimer + Mono.CD16	0.811	0.811	0.773	0.845

Model	variables	MEAN	MEDIAN	25%	75%
14	D-dimer + Mono + Mono.CD16	0.824	0.822	0.792	0.864
15	D-dimer + Lactate + Mono.CD16	0.831	0.831	0.779	0.875
16	D-dimer + Lactate + Mono + Mono.CD16	0.839	0.841	0.798	0.880
17	CRP + D-dimer	0.866	0.867	0.856	0.887
18	CRP + Mono	0.872	0.883	0.855	0.894
19	CRP + Lactate	0.872	0.875	0.860	0.890
20	CRP + D-dimer + Lactate	0.874	0.875	0.864	0.890
21	CRP + Lactate + Mono	0.875	0.883	0.860	0.894
22	CRP + D-dimer + Mono	0.883	0.886	0.864	0.902
23	CRP + D-dimer + Lactate + Mono	0.886	0.888	0.867	0.902
24	CRP + Mono.CD16	0.888	0.890	0.867	0.910
25	CRP + Mono + Mono.CD16	0.893	0.890	0.874	0.913
26	CRP + Lactate + Mono.CD16	0.895	0.894	0.871	0.913
27	CRP + D-dimer + Mono.CD16	0.896	0.896	0.871	0.920
28	CRP + Lactate + Mono + Mono.CD16	0.899	0.898	0.883	0.920
29	CRP + D-dimer + Lactate + Mono.CD16	0.900	0.898	0.878	0.924
30	CRP + D-dimer + Mono + Mono.CD16	0.903	0.905	0.886	0.929
31	CRP + D-dimer + Lactate + Mono + Mono.CD16	0.910	0.909	0.890	0.932
32	SeptiScore	0.888	0.888	0.888	0.888
33	SeptiScore + D-dimer	0.893	0.890	0.886	0.898
34	SeptiScore + Lactate	0.895	0.894	0.886	0.902
35	SeptiScore + Mono	0.896	0.898	0.883	0.906
36	SeptiScore + D-dimer + Mono	0.900	0.900	0.890	0.905
37	SeptiScore + CRP	0.901	0.913	0.883	0.917
38	SeptiScore + D-dimer + Lactate	0.903	0.898	0.890	0.909

Model	variables	MEAN	MEDIAN	25%	75%
39	SeptiScore + CRP + Lactate	0.905	0.911	0.886	0.920
40	SeptiScore + Lactate + Mono	0.906	0.909	0.893	0.917
41	SeptiScore + CRP + D-dimer	0.912	0.917	0.902	0.924
42	SeptiScore + D-dimer + Lactate + Mono	0.914	0.909	0.902	0.924
43	SeptiScore + CRP + Mono	0.915	0.913	0.905	0.924
44	SeptiScore + CRP + D-dimer + Lactate	0.915	0.920	0.902	0.925
45	SeptiScore + CRP + Lactate + Mono	0.920	0.924	0.905	0.932
46	SeptiScore + CRP + D-dimer + Mono	0.924	0.922	0.909	0.936
47	SeptiScore + Mono.CD16	0.925	0.920	0.898	0.951
48	SeptiScore + Mono + Mono.CD16	0.929	0.924	0.905	0.952
49	SeptiScore + CRP + D-dimer + Lactate + Mono	0.930	0.932	0.913	0.943
50	SeptiScore + Lactate + Mono.CD16	0.933	0.932	0.902	0.958
51	SeptiScore + CRP + Mono.CD16	0.939	0.939	0.920	0.962
52	SeptiScore + Lactate + Mono + Mono.CD16	0.939	0.943	0.917	0.962
53	SeptiScore + D-dimer + Mono.CD16	0.942	0.943	0.923	0.963
54	SeptiScore + CRP + Lactate + Mono.CD16	0.943	0.943	0.920	0.966
55	SeptiScore + CRP + Mono + Mono.CD16	0.944	0.943	0.924	0.967
56	SeptiScore + D-dimer + Mono + Mono.CD16	0.946	0.947	0.924	0.970
57	SeptiScore + CRP + Lactate + Mono + Mono.CD16	0.948	0.947	0.931	0.970
58	SeptiScore + D-dimer + Lactate + Mono.CD16	0.952	0.955	0.932	0.973
59	SeptiScore + CRP + D-dimer + Mono.CD16	0.952	0.951	0.936	0.973
60	SeptiScore + D-dimer + Lactate + Mono + Mono.CD16	0.956	0.955	0.932	0.974
61	SeptiScore + CRP + D-dimer + Lactate + Mono.CD16	0.956	0.955	0.939	0.973
62	SeptiScore + CRP + D-dimer + Mono + Mono.CD16	0.956	0.955	0.936	0.973
63	SeptiScore + CRP + D-dimer + Lactate + Mono + Mono.CD16	0.961	0.962	0.942	0.978