

Supplementary material

Supplementary Table S1. The main symptoms of COVID-19 patients with 3-month follow-up.

Variables*	Total (N=647)	Non-severe (N=399)	Severe (N=248)	P
Age, year	58 (15)	55 (15)	63 (13)	<0.001
Gender, male, n (%)	287 (44)	165 (41)	122 (49)	0.051
SOFA score	1 (0-2)	0 (0-1)	2 (1-3)	<0.001
Comorbidities, N (%)				
Hypertension	191 (30)	104 (26)	87 (35)	0.015
Diabetes	70 (11)	41 (10)	29 (12)	0.572
CRD	36 (6)	17 (4)	19 (8)	0.067
CHD	33 (5)	19 (5)	14 (6)	0.620
Tumor	19 (3)	14 (4)	5 (2)	0.274
Arrhythmia	11 (2)	8 (2)	3 (1)	0.545
Symptoms at three-month follow-up, N (%)				
Weakness	87 (13)	41 (10)	46 (19)	0.003
Palpitation	63 (10)	29 (7)	34 (14)	0.007
Dyspnea	56 (9)	26 (7)	30 (12)	0.014
Cough	38 (6)	20 (5)	18 (7)	0.238
Lower limb edema	8 (1)	4 (1)	4 (2)	0.490

Chest pain	6 (1)	3 (1)	3 (1)	0.680
Hemoptysis	1 (0.2)	1 (0.3)	0 (0)	1.000

Abbreviations: SOFA, Sequential Organ Failure Assessment; CRD, Chronic Respiratory Disease; CHD, Chronic Heart Disease.

* Continuous variables were summarized as mean (SD) or median (interquartile ranges [IQR]) where appropriate and categorical variables were number (percentage).

Supplementary Table S2. The characteristics in COVID-19 patients with or without sequelae at three-month follow-up.

Variables	Total (N=647)	No sequelae (N=509)	With sequelae (N=138)	P
Demographics and clinical characteristics				
Age, year	58 (15)	58±15	60±15	0.120
Gender, male, n (%)	287 (44)	230 (45)	57 (41)	0.416
SOFA score	1 (0-2)	1(0-2)	1 (0-2)	0.662
BMI, kg/m ²	23.87±3.18	24.07±3.33	23.06±2.47	0.229
Severity				<0.001*
Severe	248(38)	177(35)	71(51)	
Non-severe	399(62)	332(65)	67(49)	
Comorbidities, n (%)				
Hypertension	191(30)	150 (30)	41 (30)	0.956
Diabetes	70 (11)	57 (11)	13 (9)	0.551
CRD	36 (6)	27 (5)	9 (7)	0.580
CHD	33 (5)	30 (6)	3 (2)	0.078
Tumor	19 (3)	16 (3)	3 (2)	0.777
Arrhythmia	11(2)	9 (2)	2 (1)	1.000
Laboratory findings on admission				
WBC, 10 ⁹ /L	4.98 (3.80-6.28)	4.90 (3.78-6.20)	5.27 (3.87-6.79)	0.045*
Lymphocyte, 10 ⁹ /L	0.90 (0.65-1.22)	0.91 (0.66-1.22)	0.88 (0.64-1.22)	0.521

HCRP, mg/L	33.31 (8.71-83.79)	30.09 (7.53-79.85)	48.21 (13.05-100.33)	0.009*
NT-proBNP, pg/mL	286.40 (95.80-566.55)	278.20 (95.90-553.20)	312.90 (90.68-705.53)	0.160
CK-MB, U/L	10.45 (7.70-13.60)	10.45 (7.54-13.46)	10.52 (8.05-14.06)	0.445
D-dimer, mg/L	0.40 (0.31-0.62)	0.40(0.31-0.58)	0.45(0.31-0.92)	0.006*
Fibrinogen, g/L	3.91(2.96-4.69)	3.81(2.96-4.69)	3.91(3.01-4.69)	0.450
Platelet, 10 ⁹ /L	187(179-285)	186(140-231)	191(147-247)	0.227

Laboratory findings on discharge

WBC, 10 ⁹ /L	5.23 (4.21-6.35)	5.17 (4.25-6.28)	5.38 (4.05-6.68)	0.576
Lymphocyte, 10 ⁹ /L	1.30 (1.00-1.59)	1.31 (1.01-1.61)	1.26 (0.91-1.58)	0.126
HCRP, mg/L	4.03 (1.37-15.53)	3.99 (1.32-15.53)	4.36 (1.61-15.32)	0.742
D-dimer, mg/L	0.41 (0.29-0.73)	0.41 (0.29-0.73)	0.43 (0.30-0.73)	0.411
Fibrinogen, g/L	3.20 (2.56-4.00)	3.20 (2.56-4.00)	3.13 (2.64-3.99)	0.936
Platelet, 10 ⁹ /L	223 (179-285)	223 (179-287)	223 (176-275)	0.771
Inpatient days	18±8	17±8	19±10	0.002*

Abbreviations: SOFA, sequential organ failure assessment; BMI, body mass index; CRD, chronic respiratory disease; CHD, chronic heart disease; WBC, White blood cell; HCRP, Hypersensitive c-reactive protein; NT-proBNP, N-terminal pro brain natriuretic peptide; CK-MB, Creatine kinase-MB. * $P < 0.05$

Supplementary Table S3. Risk factors associated with the occurrence of sequelae.

	Univariable OR (95%CI)	P Value	Multivariable OR (95%CI)	P Value
Demographics and clinical characteristics				
Age, year	1.01 (1.00-1.02)	0.114	1.0 (0.99-1.01)	0.909
Gender, male (vs. female)	0.9 (0.6-1.3)	0.416	0.7 (0.5-1.1)	0.718
Sofa score	1.0 (0.9-1.1)	0.905		
BMI, kg/m ²	0.9 (0.7-1.1)	0.303		
Severe pneumonia	2.0 (1.4-2.9)	<0.001*	1.7 (1.1-2.6)	0.026*
Comorbidities present (vs. not present)				
Hypertension	1.0 (0.7-1.5)	0.956		
Diabetes	0.8 (0.4-1.6)	0.551		
CRD	1.2 (0.6-2.7)	0.581		
CHD	0.4 (0.1-1.2)	0.091		
Tumor	0.7 (0.2-2.4)	0.552		
Arrhythmia	0.8 (0.2-3.8)	0.797		
Laboratory findings on admission				
WBC, 10 ⁹ /L	1.1 (1.0-1.2)	0.017*	1.08 (0.99-1.17)	0.079
Lymphocyte, 10 ⁹ /L	0.9 (0.6-1.3)	0.533		
HCRP, mg/L	1.004 (1.001-1.007)	0.015*	1.002 (0.998-1.006)	0.332
CK-MB, U/L	1.00 (0.98-1.03)	0.835		

D-dimer, mg/L	1.07 (1.00-1.14)	0.043*	1.03 (0.97-1.10)	0.348
Fibrinogen, g/L	1.1 (0.9-1.2)	0.343		
Platelet, 10 ⁹ /L	1.002 (0.999-1.004)	0.181		
Inpatient days	1.03 (1.01-1.06)	0.003*	1.03 (1.00-1.05)	0.041*

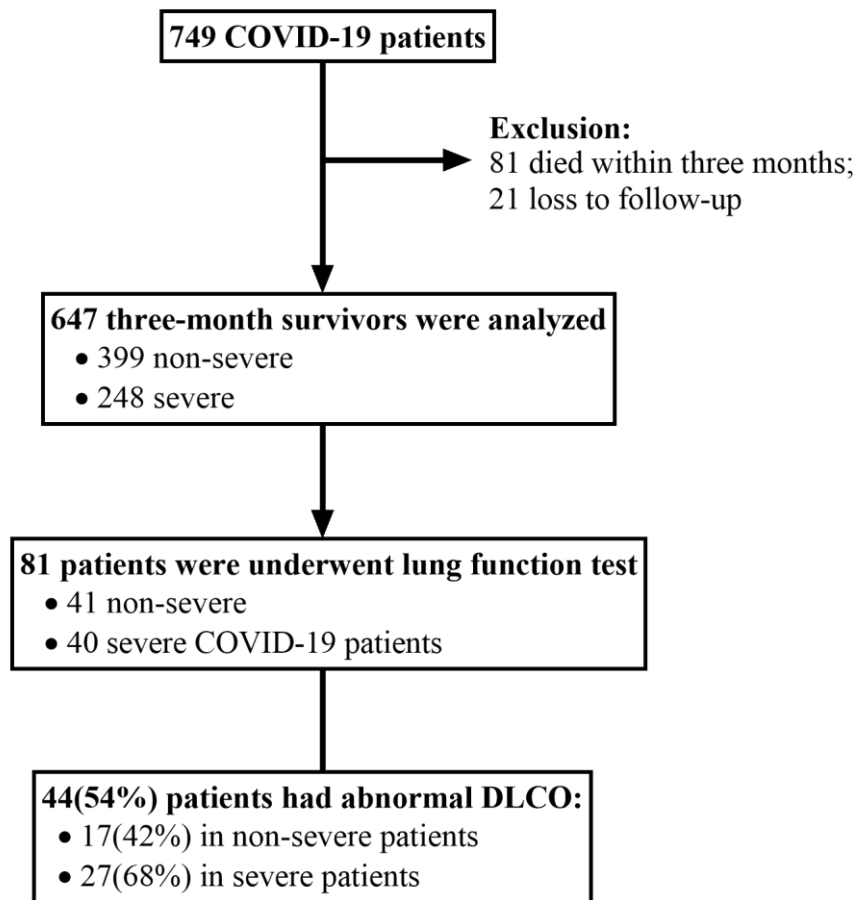
Abbreviations: SOFA, sequential organ failure assessment; BMI, body mass index; CRD, chronic respiratory disease; CHD, chronic heart disease; WBC, White blood cell; HCRP, Hypersensitive c-reactive protein; NT-proBNP, N-terminal pro brain natriuretic peptide; CK-MB, Creatine kinase-MB. * $P < 0.05$

Supplementary Table S4. Factors associated with impaired DLCO in univariable and multivariable analysis.

	Univariable OR (95%CI)	P Value	Multivariable OR (95%CI)	P Value
Demographics and clinical characteristics				
Age, year	1.01 (0.98-1.05)	0.455	0.99(0.95-1.03)	0.721
Male (vs. female)	2.1 (0.8-5.2)	0.113		
Sofa score	1.3 (0.9-1.8)	0.160		
BMI, kg/m ²	1.0 (0.9-1.2)	0.976		
Severe pneumonia	2.9 (1.2-7.3)	0.020*		
Padua score	1.2 (1.0-1.5)	0.055		
Comorbidities present (vs. not present)				
Hypertension	1.5 (0.5-3.9)	0.457		
Diabetes	0.3 (0.1-1.7)	0.171		
Chronic respiratory disease	1.3 (0.2-8.1)	0.793		
Tumor	0.8 (0.1-13.9)	0.901		
Laboratory findings on admission				
WBC, 10 ⁹ /L	1.0(0.8-1.2)	0.752		
Lymphocyte, 10 ⁹ /L	0.5(0.2-1.3)	0.137		
HCRP, mg/L	1.01(1.00-1.01)	0.157		
CK-MB, U/L	1.1(1.0-1.2)	0.155		
D-dimer, mg/L	1.1(0.9-1.2)	0.467		

Fibrinogen, g/L	0.9(0.6-1.2)	0.388		
Platelet, 10 ⁹ /L	0.99(0.99-1.00)	0.055		
Treatments during hospitalization, N (%)				
Corticosteroids	1.3(0.4-3.7)	0.675		
HFNC	1.4(0.4-4.8)	0.570		
Noninvasive MV	1.7(0.7-4.3)	0.234		
ARDS	3.6(1.2-10.3)	0.019*	4.6(1.4-15.5)	0.014*
TSS > 10.5 at admission	7.7(2.5-23.4)	<0.001*	10.4(2.5-44.1)	0.001*
MPA diameter at admission	1.2(1.0-1.4)	0.027*	1.0(0.8-1.2)	0.838

Abbreviations: SOFA, sequential organ failure assessment; BMI, body mass index; WBC, White blood cell; HCRP, Hypersensitive c-reactive protein; NT-proBNP, N-terminal pro brain natriuretic peptide; CK-MB, Creatine kinase-MB; HFNC, Transnasal Hyperflow Oxygen Therapy; MV, mechanical ventilation; ARDS, Acute Respiratory Distress Syndrome; TSS, total severity score. MPA, main pulmonary artery. * $P < 0.05$



Supplementary Figure S1. The flow chat of studied COVID-19 patient