

COVID-19 in Lung Transplant recipients - Supplemental Digital Content

Jonathan Messika, MD, PhD, Philippine Eloy, PharmD, Antoine Roux MD, PhD, Sandrine Hirschi, MD, Ana Nieves, MD, Jérôme Le Pavec, MD, PhD, Agathe Sénéchal, MD, Christel Saint Raymond, MD, Nicolas Carlier, MD, Xavier Demant MD, Aurélie Le Borgne, MD, Adrien Tissot, MD, Marie-Pierre Debray, MD, Laurence Beaumont MD, Benjamin Renaud-Picard, MD, Martine Reynaud-Gaubert, MD, PhD, Jean-François Mornex, MD, PhD, Loïc Falque, MD, Véronique Boussaud, MD, Jacques Jougon, MD, PhD, Sacha Mussot MD, Hervé Mal, MD, PhD for the French Group of Lung Transplantation.

Methods

Data collection

Study data were collected anonymously and managed by physicians and research teams by using REDCap (Research Electronic Data Capture) electronic data capture tools hosted at the Research Unit of Hôpital Bichat-Claude Bernard, (URC PNVS) AP-HP, Paris.²⁰ REDCap is a secure, web-based software platform designed to support data capture for research studies.

Demographic data collected included sex and age. Type of LT (single or double lung, combined organs), date of LT, and the underlying diagnosis were recorded. Type and stage of chronic lung allograft dysfunction before the episode were defined according to the best forced expiratory volume in 1 sec (FEV₁), the last FEV₁, and forced vital capacity.¹⁹ Comorbid conditions and type of current or recent immunosuppressive therapies were recorded. Clinical, biological and CT findings at diagnosis of COVID-19, type of sample positive for SARS-CoV-2, community- or hospital-acquired type of the episode, and presence of coinfection or super-infection were collected. Patients were followed up after the episode until May 19, 2020 when the data collection system was frozen.

Definitions

Overweight was considered body mass index ≥ 25 and < 30 kg/m² and obesity body mass index ≥ 30 kg/m². The need for ICU admission, occurrence of a thrombo-embolic disease confirmed by a CT-scan or a ultrasonographic examination, occurrence of acute respiratory distress syndrome (ARDS),²³ occurrence of acute kidney injury,²⁴ and overdose of calcineurin inhibitors were considered COVID-19 complications.

Results

The underlying conditions for the 35 patients were obstructive pulmonary disease (12; 34.3%), cystic fibrosis (11; 31.4%); interstitial lung disease (9; 25.7%), primary pulmonary arterial hypertension (1; 2.9%), graft-vs-host pulmonary disease (1; 2.9%) or lymphangioleiomyomatosis (1; 2.9%). Fifteen patients had arterial hypertension (42.9%): 10 (28.6%) received a renin-angiotensin system blocker.

Supporting Information Table 1. Individual data of the 35 lung transplant recipients with COVID-19													
Pt n°	Gender, Age	Time from LT (days)	Underlying disease	Type of LT	Comorbid conditions	Ongoing treatments	Symptoms, type of acquisition	Type of diagnosis	Chest CT findings	Settings of treatment	Immunosuppression and specific management	Complications	Outcome and length of follow-up
#1	F, 58 y	490	Interstitial lung disease	DSLT	- BMI 25.9 kg/m ² - Bronchial stenosis, recalibration procedure 2.5 months earlier - Arterial hypertension - Diabetes mellitus	- CNI, AM, CS - Insulin - RAB	Fever, dyspnea, desaturation, asthenia; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – in BAL and nasopharyngeal swab	Moderate bilateral ground-glass opacities	Respiratory ward and ICU	High-dose CS, withdrawal of AM, Anakinra	- Multi-organ failure requiring invasive mechanical ventilation, renal replacement therapy, catecholamine infusion - <i>S. aureus</i> ventilator associated pneumonia; <i>Enterococcus</i> sp. Bacteremia - CNI overdose	Deceased 24 days after COVID-19 diagnosis
#2	M, 72 y	3706	Interstitial lung disease	R-SSLT	- BMI 26.0 kg/m ² - Stable bronchial stenosis - Chronic kidney disease - CLAD 3 - Arterial hypertension - Diabetes mellitus - <i>Pseudomonas aeruginosa</i> lower respiratory tract infections, last episode in Sept 2019.	- CNI, AM, CS - Azithromycin - RAB	Fever, cough, expectoration, dyspnea, desaturation, myalgia, asthenia, headache, diarrhea; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – in BAL Co-isolation of <i>Corynebacterium</i> sp. and <i>Pseudomonas aeruginosa</i>	Minimal, unilateral ground-glass opacities	Respiratory ward	Withdrawal of AM, continuation of Azithromycin	- CNI overdose	Discharged alive after a length of stay of 12 d Alive after 34 d of follow-up
#3	M, 47 y	302	Obstructive pulmonary disease	DSLT	- BMI 16.8 kg/m ² - Antibody mediated rejection	- CNI, AM, CS - Corticosteroid pulses 13 d prior to diagnosis - Rituximab infusion 2 d prior to diagnosis - Plasmapheresis until 4 d prior to diagnosis	Fever, cough, dyspnea, desaturation; Hospital acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	Moderate bilateral ground-glass opacities, with crazy paving and consolidations	Respiratory ward and ICU	High-dose CS pulses, withdrawal of AM, Tocilizumab, Anakinra Remdesivir, Hydroxychloroquine	- Multi-organ failure requiring invasive mechanical ventilation, renal replacement therapy, catecholamine infusion - CNI overdose - Pulmonary embolism - Acute renal failure	Alive, under mechanical ventilation in the ICU after 52 d of follow-up
#4	M, 66 y	818	Obstructive pulmonary disease	L-SSLT	- BMI 19.6 kg/m ² - Chronic kidney disease	- CNI, AM, CS - Azithromycin	Fever, dyspnea, anosmia, myalgia, diarrhea, anosmia; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No CT-scan performed	Exclusive ambulatory management	No change in immunosuppressive treatments; no specific therapy, continuation of Azithromycin	None	Alive after 55 d of follow-up
#5	F, 50 y	287	Interstitial lung disease	DSLT	- BMI 29.3 kg/m ² - Bronchial stenosis, recalibration procedure 6 days earlier - Arterial hypertension	- CNI, mTOR inhibitor, CS - RAB	Fever, dyspnea, desaturation; Hospital acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab Co-isolation of a rhinovirus/enterovirus	Extensive bilateral, ground-glass opacities, with consolidations	Respiratory ward and ICU	High-dose CS, withdrawal of mTOR inhibitor Hydroxychloroquine	- Multi-organ failure requiring mechanical ventilation, catecholamine infusion	Deceased 15 days after COVID-19 diagnosis
#6	F, 57 y	1830	Interstitial lung disease	DSLT	- BMI 20.5 kg/m ² - Chronic kidney disease - Arterial hypertension - Diabetes mellitus	- CNI, AM, CS - Azithromycin - Insulin	Fever, desaturation, diarrhea, acute renal failure; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	Extensive bilateral ground-glass opacities	Respiratory ward	No change in immunosuppressive treatments; no specific therapy, continuation of Azithromycin	None	Discharged alive after a length of stay of 5 d Alive after 46 d of follow-up
#7	M, 63 y	99	Interstitial lung disease	R-SSLT	- BMI 30.0 kg/m ² - ischemic heart disease	- CNI, AM, CS - Corticosteroid pulses 3 d prior to COVID-19 diagnosis for acute cellular rejection	Fever, cough, expectoration, desaturation, conjunctivitis; Hospital acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab Co-isolation of a <i>P. aeruginosa</i>	Extensive bilateral ground-glass opacities, with a predominance on the native lung	Respiratory ward and ICU	Withdrawal of AM Lopinavir-Ritonavir followed by Remdesivir	- Respiratory failure requiring nasal high-flow oxygen therapy - CNI overdose - Pulmonary embolism	Discharged alive after a length of stay of 12 d (incl 7 d in the ICU) Alive after 42 d of follow-up
#8	M, 68 y	2621	Obstructive pulmonary disease	L-SSLT	- BMI 25.6 kg/m ² - Chronic kidney disease - CLAD 1	- CNI, AM, CS - Azithromycin	Fever, cough, expectoration, dyspnea, diarrhea; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – in BAL	Minimal, bilateral ground-glass opacities, with consolidations	Respiratory ward	High-dose CS; no specific therapy, continuation of Azithromycin	None	Deceased 5 d after COVID-19 diagnosis
#9	M, 64 y	143	Interstitial lung disease	DSLT	- BMI 26.7 kg/m ² - Arterial hypertension - Bronchial stenosis with a stent implanted, 34 d earlier recalibration procedure 18 days earlier - Diabetes mellitus	- CNI, mTOR inhibitor, CS	Dyspnea, desaturation, Hospital acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – in BAL CMV reactivation Co-isolation of a <i>Corynebacterium</i> sp.	Extensive bilateral ground-glass opacities with crazy paving	ICU	No change in immunosuppressive treatments; no specific therapy	- Respiratory failure requiring invasive mechanical ventilation - <i>P. aeruginosa</i> ventilator associated pneumonia - persistence of <i>Corynebacterium</i> sp.	Alive, and still in the ICU after 57 d of follow-up
#10	M, 30 y	52	Interstitial lung disease	DSLT	- BMI 27.4 kg/m ²	- CNI, AM, CS - Corticosteroid pulses 10 d prior to COVID-19 diagnosis for acute cellular rejection - Plasmapheresis until 8 d prior to diagnosis	Desaturation, Hospital acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – in BAL	Extensive bilateral ground-glass opacities with crazy paving and consolidations	ICU – patient already in the ICU at the time of diagnosis	Withdrawal of AM	- Multi-organ failure requiring invasive mechanical ventilation, catecholamine infusion, renal replacement therapy - <i>P. aeruginosa</i> ventilator associated pneumonia - CNI overdose	Deceased 16 days after COVID-19 diagnosis
#11	M, 48 y	5375	Cystic fibrosis	DSLT	- BMI 21.5 kg/m ² - Kidney transplantation in 2012 - CLAD 1	- CNI, AM, CS - Azithromycin	Fever, dyspnea, myalgia, asthenia, acute renal failure; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No CT-scan performed	Respiratory ward and ICU	High-dose CS, Sarilumab; no specific therapy, continuation of Azithromycin	- Respiratory failure requiring continuous positive airway pressure - CNI overdose	Discharged alive after a length of stay of 36 d (incl 10 d in the ICU) Alive after 57 d of follow-up
#12	F, 42 y	1332	Cystic fibrosis	DSLT	- BMI 20.2 kg/m ²	- CNI, AM, CS	Myalgia, asthenia, headache; Community acquired	Highly suspected, non-confirmed by RT-PCR (not performed)	Extensive bilateral ground-glass opacities with crazy paving	Respiratory ward	High-dose CS, withdrawal of CNI and AM Hydroxychloroquine	<i>P. aeruginosa</i> nosocomial pneumonia	Discharged alive after a length of stay of 19 d. Alive after 50 d of follow-up

#13	F, 59 y	4231	Lymphagioleiomyomatosis	R-SSLT	- BMI 22.5 kg/m ² - CLAD 1	- CNI, mTOR inhibitor, CS - Azithromycin	Fever, dyspnea, asthenia; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No CT-scan performed	ICU and Respiratory ward	No change in immunosuppressive treatments Lopinavir-Ritonavir association, continuation of Azithromycin	- CNI overdose	Discharged alive after a length of stay of 19 d (incl 4 d in the ICU). Alive after 61 d of follow-up
#14	M, 46 y	3266	Cystic fibrosis	DSLST	- BMI 20.3 kg/m ² - Chronic kidney disease - Arterial hypertension - Diabetes mellitus	- CNI, AM, CS - Azithromycin - RAB - Insulin	Fever, cough, expectoration, dyspnea, myalgia, headache, asthenia; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – in BAL	Severe bilateral ground-glass opacities with crazy paving and consolidations	Respiratory ward and ICU	High-dose CS; no specific therapy, continuation of Azithromycin	- Multi-organ failure requiring invasive mechanical ventilation, and renal replacement therapy	Discharged alive after a length of stay of 29 d (incl 11 d in the ICU) Alive after 63 d of follow-up
#15	M, 35 y	179	Cystic fibrosis	DSLST	- BMI 21.2 kg/m ² - Diabetes mellitus - <i>Pseudomonas aeruginosa</i> lower respiratory tract colonization, last sampling in Jan 2020	- CNI, AM, CS - Insulin - Induction therapy and CT pulses on transplant day (179 d before COVID-19 diagnosis)	Fever, cough, expectoration, myalgia, asthenia, headache; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	Moderate bilateral ground-glass opacities	Respiratory ward	No change in immunosuppressive treatments; no specific therapy	- <i>P. aeruginosa</i> nosocomial pneumonia	Discharged alive after a length of stay of 8 d Alive after 56 d of follow-up
#16	M, 27 y	156	Cystic fibrosis	DSLST + liver transplantation	- BMI 15.8 kg/m ²	- CNI, AM, CS - Insulin - Induction therapy on transplant day (156 d before COVID-19 diagnosis), and CT pulses until 146 d before COVID-19 diagnosis	Fever, cough, expectoration, dyspnea, myalgia; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No abnormalities	Respiratory ward	No change in immunosuppressive treatments; no specific therapy	None	Discharged alive after a length of stay of 8 d Alive after 55 d of follow-up
#17	F, 64 y	1709	Obstructive pulmonary disease	DSLST	- BMI 24.9 kg/m ² - Arterial hypertension - Diabetes mellitus	- CNI, AM, CS - Azithromycin	Fever, myalgia, asthenia, headache, diarrhea; Community acquired	Highly suspected, non-confirmed by RT-PCR (negative)	Minimal, bilateral ground-glass opacities,	Respiratory ward	No change in immunosuppressive treatments; no specific therapy, continuation of Azithromycin	- CNI overdose	Discharged alive after a length of stay of 8 d Hospital stay of 8 d. Alive after 59 d of follow-up
#18	M, 41 y	1147	Cystic fibrosis	DSLST	- BMI 24.1 kg/m ² - Stable bronchial stenosis - Diabetes mellitus	- CNI, mTOR inhibitor, CS - Azithromycin - Insulin	Fever, dyspnea, Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	Moderate bilateral ground-glass opacities	Respiratory ward	No change in immunosuppressive treatments; no specific therapy, continuation of Azithromycin	None	Discharged alive after a length of stay of 9 d Alive after 62 d of follow-up
#19	M, 61 y	216	Interstitial lung disease	DSLST	- BMI 23.8 kg/m ² - Diabetes mellitus	- CNI, AM, CS - Insulin	Fever, cough, expectoration dyspnea; Healthcare associated	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	Moderate, bilateral ground-glass opacities, with consolidations	ICU	No change in immunosuppressive treatments; no specific therapy	- Respiratory failure requiring nasal high flow oxygen therapy - Pulmonary embolism - Life sustaining therapies withheld	Deceased in ICU 3 days after COVID-19 diagnosis
#20	F, 38 y	839	Cystic fibrosis	DSLST	- BMI 20.8 kg/m ² - Diabetes mellitus	- CNI, AM, CS - RAB - Insulin	Fever, cough, expectoration, headache Community acquired	Highly suspected, non-confirmed by RT-PCR (negative)	Minimal, bilateral consolidation	Respiratory ward	No change in immunosuppressive treatments; no specific therapy	None	Discharged alive after a length of stay of 3 d Alive after 53 d of follow-up
#21	F, 63 y	2846	Obstructive pulmonary disease	DSLST	- BMI 17.5 kg/m ² - Chronic kidney disease - CLAD 2 - Arterial hypertension - Diabetes mellitus	- CNI, AM, CS - Azithromycin, external phototherapy - RAB - Insulin	Fever, cough, dyspnea, desaturation, asthenia; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No CT-scan performed	ICU and Respiratory ward	High-dose CS, withdrawal of AM, continuation of Azithromycin	None	Discharged alive after a length of stay of 7 d (incl 3 d in the ICU) Alive after 66 d of follow-up
#22	M, 67 y	134	Interstitial lung disease	DSLST	- BMI 28.2 kg/m ² - Chronic kidney disease - Arterial hypertension - Diabetes mellitus	- CNI, AM, CS - CT pulses on transplant day (134 d prior to COVID-19)	Desaturation, myalgia, asthenia, diarrhea; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab and tracheal aspirate	Severe bilateral ground-glass opacities	ICU	High-dose CS, withdrawal of AM; no specific therapy	- Respiratory failure requiring invasive mechanical ventilation and extracorporeal membrane oxygenation - <i>Staphylococcus aureus</i> and <i>Haemophilus influenzae</i> ventilator associated pneumonia - CNI overdose	Alive, and still in the ICU after 44 d of follow-up
#23	F, 60 y	1346	Obstructive pulmonary disease	DSLST	- BMI 27.6 kg/m ² - Arterial hypertension	- CNI, AM, CS - Azithromycin	Fever, cough, asthenia, diarrhea, ageusia; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	Minimal, bilateral ground-glass opacities with consolidations	Respiratory ward	Withdrawal of AM; no specific therapy, continuation of Azithromycin	None	Discharged alive after a length of stay of 6 d Alive after 41 d of follow-up
#24	F, 48 y	2079	Graft-versus-host pulmonary disease	DSLST	- BMI 17.0 kg/m ² - Chronic kidney disease - CLAD 1 - <i>Pseudomonas aeruginosa</i> lower respiratory tract infections, last episode in Nov 2019.	- CNI, mTOR inhibitor, AM, CS - Azithromycin	Fever, cough, expectoration, diarrhea; Healthcare-associated	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab Co-isolation of <i>P. aeruginosa</i>	Moderate, bilateral ground-glass opacities with crazy paving	Respiratory ward	High-dose CS, withdrawal of mTOR inhibitor; no specific therapy, continuation of Azithromycin	- <i>P. aeruginosa</i> persistence and pneumonia	Discharged alive after hospital stay of 41 d.
#25	M, 31 y	2760	Cystic fibrosis	DSLST	- BMI 21.4 kg/m ² - CLAD 2 - Arterial hypertension	- CNI, mTOR inhibitor, AM, CS - Azithromycin	Fever, cough, myalgia, asthenia, anosmia; Community acquired	Highly suspected, non-confirmed by RT-PCR (not performed)	Extensive, bilateral ground-glass opacities with consolidations	Exclusive ambulatory management	No change in immunosuppressive treatments; no specific therapy, continuation of Azithromycin	Lower limb ischemia from embolic origin 31 days after COVID-19 diagnosis	Alive after 27 d of follow-up
#26	M, 34 y	514	Cystic fibrosis	DSLST	- BMI 20.7 kg/m ² - Chronic kidney disease - Arterial hypertension - Diabetes mellitus	- CNI, AM, CS - Insulin	Asymptomatic; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No CT-scan performed	Exclusive ambulatory management	No change in immunosuppressive treatments; no specific therapy	None	Alive after 55 d of follow-up
#27	M, 48 y	5515	Obstructive pulmonary disease	DSLST	- BMI 21.5 kg/m ² - Arterial hypertension - Past history of melanoma (2013)	- CNI, AM - RAB	Cough, dyspnea, headache, anosmia, ageusia; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No CT-scan performed	Exclusive ambulatory management	No change in immunosuppressive treatments; Hydroxychloroquine and Azithromycin	None	Alive after 53 d of follow-up
#28	F, 41 y	2036	Cystic fibrosis	DSLST	- BMI 20.3 kg/m ² - Arterial hypertension	- CNI, AM, CS - RAB	Fever, cough, expectoration, myalgia,	Ascertained by a positive SARS-CoV-2 RT-PCR –	No CT-scan performed	Respiratory ward	High-dose CS, withdrawal of AM; Hydroxychloroquine	<i>Staphylococcus haemolyticus</i> nosocomial	Discharged alive after a length of stay of 18 d

					- Chronic kidney disease - Diabetes mellitus		headache; Community acquired	nasopharyngeal swab			and Azithromycin	pneumonia Pulmonary Aspergillosis	Alive after 57 d of follow-up
#29	F, 40 y	5510	Cystic fibrosis	DSLTL	- BMI 23.9 kg/m ² - Arterial hypertension - Diabetes mellitus - Past history of diffuse B-cell lymphoma (2018) - <i>Pseudomonas aeruginosa</i> lower respiratory tract infections, last episode in June, 2019.	- CNI, CS - Azithromycin - RAB	Fever, cough, expectoration, myalgia, asthenia, headache, anosmia; Community acquired	Highly suspected, non-confirmed by RT-PCR (negative) Co-isolation of <i>P. aeruginosa</i>	Moderate, bilateral ground-glass opacities with consolidations	Respiratory ward	No change in immunosuppressive treatments; no specific therapy, continuation of Azithromycin	None	Discharged alive after a length of stay of 15 d. Alive after 48 d of follow-up
#30	F, 68 y	89	Obstructive pulmonary disease	DSLTL	- BMI 20.4 kg/m ² - Chronic kidney disease	- CNI, AM, CS - RAB - Induction therapy and CT pulse on transplant day (89 d before COVID-19 diagnosis)	Fever, cough, expectoration, asthenia, headache, diarrhea; Healthcare-associated	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No CT-scan performed	Respiratory ward and ICU	Withdrawal of AM; Hydroxychloroquine	<i>Stenotrophomonas maltophilia</i> and <i>Enterobacter spp.</i> nosocomial pneumonia	Length of hospital stay in the respiratory ward of 48 d; admitted in the ICU after 48 d of COVID-19 course and still in the ICU after 49 d of follow-up
#31	F, 60 y	380	Obstructive pulmonary disease	R-SSLT	- BMI 20.7 kg/m ² - Chronic kidney disease requiring renal replacement therapy - Past history of lung cancer (2003)	- CNI, AM, CS	Cough, expectoration, diarrhea; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	No CT-scan performed	Respiratory ward	Withdrawal of AM; no specific therapy	None	Discharged alive after a length of stay of 7 d. Alive after 49 d of follow-up
#32	M, 63 y	1250	Obstructive pulmonary disease	R-SSLT	- BMI 19.5 kg/m ² - Chronic kidney disease - active rectal cancer under chemotherapy	- CNI, mTOR inhibitor, CS - chemotherapy	Fever, asthenia, headache, diarrhea, acute renal failure; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab Co-isolation of <i>S. pneumoniae</i>	No CT-scan performed	Respiratory ward	Withdrawal of mTOR inhibitor; no specific therapy	- Acute on chronic renal failure - No eradication of <i>S. pneumoniae</i>	Discharged alive after a length of stay of 13 d. Alive after 41 d of follow-up
#33	M, 61 y	27	Obstructive pulmonary disease	DSLTL	- BMI 25.8 kg/m ² - ischemic heart disease	- CNI, AM, CS - Azithromycin	No symptom, systematic sampling; Hospital acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	Moderate, bilateral ground-glass opacities with consolidations	Respiratory ward	Withdrawal of AM; Hydroxychloroquine, continuation of Azithromycin	None	Discharged alive after a length of stay of 5 d. Alive after 57 d of follow-up
#34	F, 40 y	1915	Pulmonary arterial hypertension	DSLTL	- BMI 19.1 kg/m ² - Chronic kidney disease	- CNI, AM	Cough, Myalgia, asthenia, headache, acute renal failure; Community acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab	Minimal, bilateral ground-glass opacities with crazy paving and consolidations	Respiratory ward	No change in immunosuppressive treatments; Hydroxychloroquine	- Acute on chronic renal failure	Discharged alive after a length of stay of 3 d. Alive after 49 d of follow-up.
#35	F, 28 y	22	Obstructive pulmonary disease	DSLTL	- BMI 22.9 kg/m ² - Bronchial ischemia - Previous <i>P. aeruginosa</i> colonization, last sampling in sept 2019.	- CNI, AM, CS	No symptom, systematic sampling; Hospital acquired	Ascertained by a positive SARS-CoV-2 RT-PCR – nasopharyngeal swab Co-isolation of <i>P. aeruginosa</i>	Moderate, unilateral ground-glass opacities	Respiratory ward	No change in immunosuppressive treatments; Hydroxychloroquine	<i>P. aeruginosa</i> nosocomial pneumonia	Alive and still in hospital after 52 d of COVID-19

AM: anti-metabolite; BAL: bronchoalveolar lavage; BMI: body mass index; BOS: bronchiolitis obliterans syndrome; CLAD: chronic lung allograft dysfunction; CNI: calcineurin inhibitor; CS: corticosteroids ; CT: computed tomography; DSLTL: double side lung transplant ; F: female ; L-SSLT: left single side lung transplant; M: male; RAB: renin-aldosterone blocker; R-SSLT: right single side lung transplant.

Supporting Information Table 2. Main comorbid conditions

	Total n=35	ICU n=13	Hospital ward n=18	Outpatients n=4	Survivors n=30	Non-survivors n=5
Blood group n (%)						
O	11 (31.4)	5 (38.5)	3 (16.7)	3 (75)	8 (26.7)	3
A	15 (42.9)	6 (46.2)	8 (44.4)	1 (25)	14 (46.7)	1
B	3 (8.6)	0	3 (16.7)	0	3 (10)	0
AB	6 (17.1)	2 (15.4)	4 (22.2)	0	5 (16.7)	1
Best FEV1 after LT (mL)	2550 [1865-3108]	2630 [1745-2868]	2340 [1872-2775]	3660 [2766-4221]	2640 [1965-3215]	1285 [1276-1340]
Best FEV1 after LT (%)	81.5 [70.0-99.3]	90.0 [72.0-115]	80.0 [67.0-96.0]	83.5 [72.5-94.0]	86.5 [72.0-103.0]	43.5 [37.8-56.0]
Comorbid conditions						
Ischemic heart disease, n (%)	2 (5.7)	1 (7.7)	1	1	2 (6.7)	0

Data are n (interquartile range) unless indicated.

ICU, intensive care unit; FEV1: forced expiratory volume in 1 sec; LT, lung transplantation

Best FEV1 was available for 31 patients

Supporting Information Table 2. Timeline of COVID-19 episode

Timeline of COVID19 episode	Total n=35	ICU n=13	Hospital ward n=18	Outpatients n=4	Survivors n=30	Non-survivors n=5
Time from LT, months	38.2 [6.6-78.3]	9.6 [4.5-98.9]	44.6 [16.5-66.8]	59.6 [24.7-114.9]	43.0 [7.0-86.3]	9.6 [7.2-16.3]
Time from illness onset to						
Fever, days	0 [0-2]	0.5 [0-2.5]	0 [0-2.0]	0 [0-0]	0 [0-3.0]	0 [0.0-0.5]
Dyspnea, days	3 [0-10.5]	7.0 [1.0-11.0]	0 [0-0.5]	11 [9.5-12.5]	3 [0-10.5]	4.5 [1.5-8.3]
Diagnosis, days	4.0 [1-7.0]	2.0 [1.0-4.0]	3.5 [1.0-6.8]	11.5 [8.0-18.0]	4.0 [1.0-7.0]	2.0 [1.0-4.0]
Hospital admission, days	4.0 [0.75-7.0]	6.0 [3.5-9.5]	5.0 [1.0-7.0]	-	4.0 [1.0-7.0]	5.0 [2.5-6.0]
ICU admission, days#	13.0 [5.5-14.8]	13.0 [5.5-14.8]	-	-	13.0 [6.0-17.0]	13.0 [8.5-13.5]
Time from hospital admission to ICU admission, days##	5.0 [2.8-17.5]	5.0 [2.8-17.5]	-	-	3.0 [2.5-26.0]	7
Time from illness onset to						
Invasive mechanical ventilation, days*	7.0 [3.5-14.0]	7.0 [3.5-14.0]	-	-	6.5 [4.5-9.5]	14.0 [7.5-14.0]
ECMO, days**	9	9	-	-	9	-

Catecholamine infusion, days§	14.0 [10.0-15.5]	14.0 [10.0-15.5]	-	-	17	13.0 [7.0-14.0]
Length of follow-up, days	50.0 [41.0-56.5]	49.0 [24.0-57.0]	49.5 [42.3-55.8]	54.0 [46.5-55.0]	52.5 [46.5-57.0]	15.0 [5.0-16.0]

ECMO: extra-corporeal membrane oxygenation; Fever was present in 25 patients; dyspnea was present in 15 patients

for the 12 patients (one acquired COVID-19 in the ICU)

*for the 7 patients who required invasive mechanical ventilation (3 non-survivors)

for the 28 patients with non-hospital acquired COVID-19

** for the sole patient who required ECMO

§ for the 4 patients who required catecholamine infusion

Supporting Information 3. Demographic, baseline and follow-up comorbidities associated with ICU admission or death

	ICU admission n = 13			Death n=5		
	Univariable OR [†] (95% CI)	<i>P</i> value	Multivariable aOR [‡] (95%CI)	<i>P</i> value	OR (95% CI)	<i>P</i> value
Male gender	1.60 [0.40-6.46]	0.73			1.31 [0.19-9.02]	1.00
Overweight (BMI \geq 25 kg/m ²)	3.86 [0.83-17.94]	0.12	3.52 [0.69-19.8]	0.13	16.0 [1.50-170.63]	0.02
Blood group	0.85 [0.40-1.66]	0.64			0.68 [0.19-1.74]	0.47
Age at COVID-19 episode	1.03 [0.98-1.10]	0.27			1.02 [0.94-1.10]	0.68
Time from LT	1.00 [0.98-1.01]	0.75			0.98 [0.94-1.01]	0.25
Time from illness onset to hospital admission	1.06 [0.97-1.20]	0.29			1.01 [0.90-1.15]	0.90
Exposure to azithromycin	0.31 [0.07-1.32]	0.16	0.54 [0.09-3.13]	0.49	0.22 [0.02-2.19]	0.34
Exposure to renin-aldosterone blockers	2.13 [0.48-9.50]	0.44			1.83 [0.26-13.06]	0.61

Immunosuppressive therapy intensification in the last 6 months	6.25 [1.00-39.09]	0.08	4.04 [0.52-41.9]	0.20	1.00 [0.09-10.66]	1.00
Presence of bronchial complications	1.80 [0.30-10.64]	0.65			4.17 [0.52-33.26]	0.21

95% CI: 95% confidence interval; BMI: body mass index

OR[†]: odds ratios of the association of each factor with outcome

aOR[‡]: adjusted odds ratios of the association with ICU admission