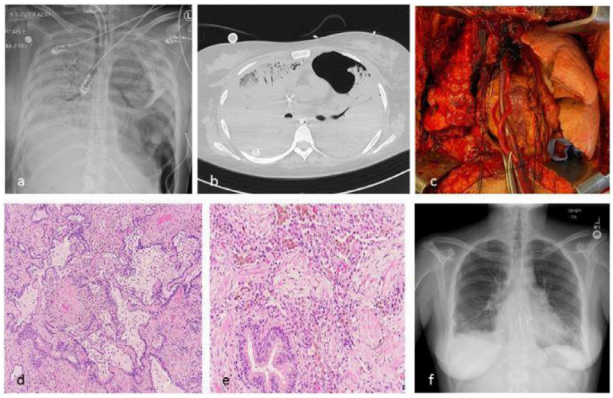
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

2 infection in the allograft, technical challenges imposed by viral-mediated injury to the native lung. Here, we report the first successful lung transplantation in a patient with non-resolving COVID-19 associated acute respiratory distress syndrome in the United States.

Case Report: The recipient was a 28-year old female with past medical history of neuromyelitis optica treated with mycophenolate and rituximab who developed COVID pneumonia leading acute respiratory distress syndrome. The patient was intubated for 8 days with prone prior to initiation of VV ECMO. Her ECMO course was complicated by right sided pneumothorax requiring multiple pleural tubes and the development of Serratia marcescens pneumonia with left lower lung necrosis, and a liver capsular bleed necessitating emergent exploratory laparotomy. (Figure1a, b) She received antibiotics, remdesivir, hydroxychloroquine, tocilizumab, and convalescent plasma. However there was no signs of recovery and she was listed for lung transplantation after ECMO support for 32 days . Implantation was supported with central VA ECMO, and there was severe dense vascular adhesions bilaterally with severe distortion of hilar. (Figure1c) Explanted Lungs damaged by COVID-19 were free of virus but pathology showed extensive evidence of acute interstitial inflammation with fibrosis which consistence with end-stage pulmonary fibrosis. (Figure1d, e) The patient was decannulated from VV ECMO on POD 17, and was discharged on POD 27. (Figure1f) Four months after transplantation, she is at home with oxygen saturations above 98% on room air.

Summary: Our experience suggest that lung transplant is the only option for survival for some patients with severe COVID-19 develop fibrotic lung.



(1266)

Bilateral Lung Transplantation for End-Stage Respiratory Failure from COVID-19 Pneumonia

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Introduction: The SARS-CoV-2 virus is causing severe end-stage fibrosis and respiratory failure in otherwise healthy individuals. Lung transplant (LTX) has been performed internationally in select patients for this indication, but there is limited evidence on its role in COVID-19. We describe a patient who received a bilateral LTX 12 weeks after an initial diagnosis of COVID-19 pneumonia.

Case Report: A 51-year-old male with hypertension and presented to an outlying hospital with dyspnea, fever and exposure to SARS-CoV-2. He was hypoxic and a diagnosis of COVID-19 pneumonia was made by nasopharyngeal swab. He was treated with dexamethasone, remdesivir, and convalescent plasma, mechanical ventilation and eventually femoral VV-ECMO cannulation to maintain oxygenation. He was extubated and was transitioned to a left subclavian dual-limb 30 Fr VV-ECMO cannula for improved rehabilitation. He was then transferred to our center for LTX consideration given refractory ARDS. Evaluation for LTX revealed pulmonary hypertension, negative SARS-CoV-2 PCR and deconditioning but no absolute contraindications. He participated in intensive rehabilitation and progressed to assisted steps despite severe deconditioning and hypoxia. He was listed for a bilateral lung transplant with a lung allocation score of 90 and received a donor offer 7 days after listing and after 82 days on ECMO. He underwent bilateral LTX via clamshell exposure with central VA ECMO support. Intraoperatively, the lungs were densely consolidated with severe hilar adenopathy without peripheral adhesions. Post-operatively, he was transitioned back to his original VV ECMO circuit and then decannulated on post-op day 3. Standard induction with basiliximab and immunosuppression with IV methylprednisolone, mycophenolate and tacrolimus was administered. He had a transient elevation of liver enzymes on post-operative day 1 and an early planned tracheostomy was performed due to deconditioning. He has since, been progressing well on oxygen via tracheostomy collar and is able to speak with a one-way valve and participate in rehabilitation.

Summary: For patients with irreversible end-stage lung disease after COVID-19 pneumonia, LTX is a viable option. Timely transfer to a lung transplant center and intensive rehabilitation are essential. Standard established immunosuppression and post-transplant protocols should be followed.

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Lung Transplantation in COVID 19 ARDS - Short Term Outcomes

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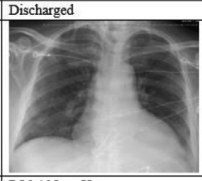
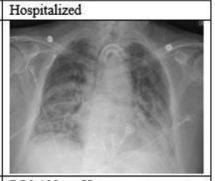
Introduction: COVID-19 associated severe acute respiratory syndrome rapidly progress to irreversible lung injury, multiple organ failure and death. Lung transplantation is considered as the rescue therapy for these patients. Herein, we reported a case series of two successful life-saving bilateral lung transplantations for COVID-19-associated respiratory failure.

Case Report: Case 1: A 69-year-old male was admitted for hypoxia and altered mental status. He was diagnosed with COVID-19 pneumonia by abnormal CT findings and positive PCR result. After receiving a course of dexamethasone, convalescent plasma, remdesivir and broad-spectrum antibiotics, he remained to be profoundly hypoxic, requiring non-invasive ventilation. Following two negative PCR results, he underwent bilateral lung transplantation on day 57. He was discharged to rehab unit on postoperative day 26. No desaturation was observed with the 6-min walk test on 30-day follow-up.

Case 2: A 63-year-old male was presented with cough, and dyspnea. He was hemodynamically stable, SpO2 was 94%, chest x-ray was normal and tested positive for COVID-19. He was discharged home with dexamethasone and bronchodilators. However, he presented back on day 6 with worsening dyspnea. He was admitted and received a course of dexamethasone, remdesivir, convalescent plasma and broad-spectrum antibiotics. Due to persistent hypoxic respiratory failure, the patient underwent bilateral orthotopic lung transplantation on day 68. His postoperative course was complicated by primary graft dysfunction stage 3 and required open tracheostomy. His condition gradually improved and decannulated. He is currently on room air and able to walk 30 ft using a roller walker.

Summary: SARS-CoV-2 recovery is characterized by post inflammatory fibrosis and multi organ dysfunction. Lung transplantation can be successfully performed in patients with final stage respiratory failure of COVID-19 related pulmonary fibrosis.

	Patient 1	Patient 2
Age	69	63
Sex	Male	Male
Comorbidities	HTN, NIDDM, HLD	HTN, HLD
Smoking status	Never smoked	Ex-smoker
Occupational history	Dust Exposure / Construction worker	None
ARDS Diagnosis (Day from PCR result)	0	6
PFR	71	52
Negative PCR - Day	41	34
COVID 19 IgG Positive Day	55	41
Ventilator support on day of transplant	Intermittent NIV/HFNC	Intermittent NIV/HFNC
Day of Lung Transplant	57	68
Donor Age	39	40
Donor Sex	Female	Female
LAS	78.43	67.22
Ischemic Times	R lung 232 minutes L lung 157min	L lung 136 minutes R lung 233 minutes
CPB Times	192 minutes	188 minutes
Intra-operative PRBC transfusion	2 units	1 unit
30-day status	Discharged	Hospitalized
X-ray at POD#30		
Last ABG	PO2 105mmHg	PO2 122mmHg
PF Ratio at POD#30	300 <	245
CMV Status (Donor/Recipient)	+/+	+/-
PGD	0	3

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Rapid Clinical Recovery from Critical COVID-19 Pneumonia with Vasoactive Intestinal Peptide Treatment

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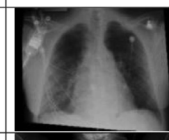
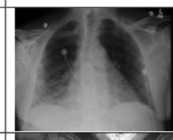
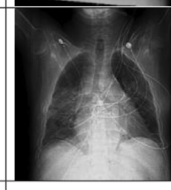
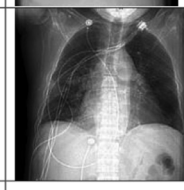
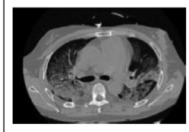
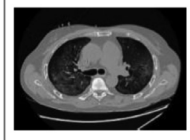
Introduction: RLF-100 (Aviptadil), a synthetic form of human Vasoactive Intestinal Peptide (VIP), is in clinical trials for treatment of critical COVID-19 pneumonia with respiratory failure. VIP was shown to protect the lung against a broad array of injuries by binding to the $VPAC_1$ receptor of alveolar type II (ATII) cells, the cells that SARS-CoV-2 binds to. The role of RLF-100 in treating lung transplant patients with COVID-19 pneumonia is unknown.

Case Report: A 54 year old man with double lung transplant presented with headache, fever and productive cough. COVID-19 infection was confirmed by positive RT-PCR of nasopharyngeal swab. The patient required only supportive care for three days and was discharged home. Two weeks later he presented with worsening dyspnea, fever and severe hypoxemia requiring high flow O2 and ICU admission. Chest CT showed diffuse bilateral consolidations. He had markedly elevated inflammatory markers. He was treated with dexamethasone and tocilizumab without improvement. He was not a candidate for Remdesivir due to chronic kidney disease. Convalescent plasma was not available. Pro-BNP level was normal; echocardiogram showed preserved biventricular function. He received Aviptadil, a total of three doses, per an open label access under an emergency use approved by US FDA. Rapid improvement in oxygenation and radiologic findings were noticed. No adverse effects were recorded. The patient was transferred out of the ICU 24 hours following the third dose and discharged home on room air 15 days later.

Summary: We report a case of lung transplant recipient with critical COVID-19 pneumonia treated with RLF-100 chieving rapid clinical and radiologic improvement. This is consistent with that VIP protects ATII cells, ameliorating the inflammation and improving oxygenation in critical COVID-19 pneumonia. A randomized prospective trial is underway to evaluate the efficacy of RLF-100 in reducing mortality and improving oxygenation in patients with critical COVID-19 pneumonia.

	Before Infusion	24- hours post 3rd infusion
Portable Chest X-Ray		
Scout CT		
Chest CT		
PaO2:FiO2	146	285.19
SaO2	98	95
FiO2	HFLNC 30 L/min, FiO2 50%	2 L/min

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SARS-CoV-2 Re-Infection in a Lung Transplant Recipient

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Introduction: Since the onset of the SARS-CoV-2 pandemic, increasing evidence has shown waning immunity after initial SARS-CoV-2 infection, and re-infection in patients with a prior history of COVID-19 has been reported. We report a case of SARS-CoV-2 re-infection in a lung transplant recipient 3 months after initial illness.

Case Report: The patient is a 56-year-old man with a history of bilateral lung transplant in August 2018 for idiopathic pulmonary fibrosis. His post-transplant course was complicated by insulin-dependent diabetes mellitus (HbA1c 5.8%), chronic renal insufficiency (eGFR nadir 48 mL/min/1.73m^2), and peripheral arterial disease requiring bilateral below-knee amputations. At the time of transplant, he was induced with basiliximab and remained on standard 3-drug immunosuppression with mycophenolate mofetil (500 mg BID), prednisone (5 mg daily), and tacrolimus. He contracted SARS-CoV-2 from his wife and tested positive for the virus on July 2, 2020 after presenting to the emergency department (ED) with headache, chills, nausea, body aches, shortness of breath, and generalized weakness. His oxygen saturation and chest X-ray were normal, and he was therefore discharged from the ED to recover at home. His symptoms resolved 17 days after diagnosis and serial SARS-CoV-2 testing via nasal washing were positive on July 16, 2020 and negative on July 30, 2020 and August 11, 2020. In addition, on October 21, 2020, he tested positive for SARS-CoV-2 antibodies (3.41, positive: index $\geq$1.4). On October 23, 2020, he presented to the ED with generalized chest pain, low-grade fever (100.1F), dyspnea, and weakness. His nasal swab was positive for SARS-CoV-2 and CT of the chest showed bibasilar ground-glass opacities consistent with atypical infection vs. atelectasis. His labs were notable for a CRP of 132 mg/L, ferritin of 2,307 ng/mL, LDH 304 units/L, D-dimer 240 ng/mL, and procalcitonin of 0.05 ng/mL. He was admitted for monitoring and treated with remdesivir, corticosteroids, and anticoagulation.

Summary: We present a case of SARS-CoV-2 re-infection 3 months after initial illness in a lung transplant recipient living in a high-incidence area. Unexpectedly, recurrent infection occurred despite development of SARS-CoV-2 antibodies. This case speaks to the vulnerability of this patient population to COVID-19 and the need for ongoing precautions to prevent infection even among patients who have seroconverted.