



Chen JY, Qiao K, Liu F, Wu B, Xu X, Jiao GQ, Lu RG, Li HX, Zhao J, Huang J, Yang Y, Lu XJ, Li JS, Jiang SY, Wang DP, Hu CX, Wang GL, Huang DX, Jiao GH, Wei D, Ye SG, Huang JA, Zhou L, Zhang XQ, He JX. **Lung transplantation as therapeutic option in acute respiratory distress syndrome for COVID-19-related pulmonary fibrosis.** *Chin Med J (Engl)*. 2020 Apr 1. doi: 10.1097/CM9.0000000000000839. [Epub ahead of print]

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Abstract:

“ **SUMMARY:** Critical patients with the 2019 coronavirus disease (COVID-19), even those whose nucleic acid test results had turned negative and those receiving maximal medical support, have been noted to progress to irreversible fatal respiratory failure. Lung transplantation (LT) as the sole therapy for end-stage pulmonary fibrosis related to acute respiratory distress syndrome has been considered as the ultimate rescue therapy for these patients. **METHODS:** From February 10 to March 10, 2020, three male patients were urgently assessed and listed for transplantation. After conducting a full ethical review and after obtaining assent from the family of the patients, we performed three LT procedures for COVID-19 patients with illness durations of >1 month and extremely high sequential organ failure assessment (SOFA) scores. **RESULTS:** Two of the three recipients survived post-LT and started participating in a rehabilitation program. Pearls of the LT team collaboration and perioperative logistics were summarized and continually improved. The pathological results of the explanted lungs were concordant with the critical clinical manifestation, and provided insight towards better understanding of the disease. Government health affair systems, virology detection tools, and modern communication technology all play key roles towards the survival of the patients and their rehabilitation. **CONCLUSIONS:** Lung transplantation can be performed in end-stage patients with respiratory failure due to COVID-19-related pulmonary fibrosis. If confirmed positive-turned-negative virology status without organ dysfunction, LT provided the final option for these patients to avoid certain death, with proper protection of transplant surgeons and medical staffs. By ensuring instant seamless care for both patients and medical teams, the goal of reducing the mortality rate and salvaging the lives of patients with COVID-19 can be attained.”

Comments by Barbara Wilkey, MD :

This three patient case series out of China describes experience with lung transplantation as salvage therapy for patients with COVID 19. To date, this is the first case series of its type to be published. Patients in the series ranged in age from 58 to 73 years, SOFA scores ranged from 14 to 18 and time of illness onset to lung transplant ranged from 37-42 days. Patient 1 was on VAV ECMO and the other two were maintained on VV ECMO preoperatively. All patients were COVID 19 positive earlier in their disease process and COVID 19 negative at the time of transplantation, all received convalescent plasma prior to transplantation and all transplants were performed with mechanical support in negative pressure rooms. Follow up time was POD 1 for patient 1, POD 22 for patient 2 and POD 12 for patient 3. Patient 1 did not survive, but also had significant coexisting cardiomyopathy. Heart and lungs were procured for this patient however the initial plan was lungs only. The patient suffered an intraoperative cardiac arrest after which he was put on CPB and a heart transplant was performed, however these valiant efforts were not successful.

In addition to describing the patient factors and clinical course, the authors also dove into the extra intraoperative challenges caused by necessary personal protective equipment. Intraoperatively PAPRs were worn by surgery, nursing, anesthesiology and “cardiopulmonary physicians”. PAPRs did interfere with the surgeons’ ability to communicate and hear monitors and PAPRs were also found to be fatiguing. As such, surgical rotation was planned, and enhanced communication was practiced. Video and audio tools were set up inside and outside the operative theater to allow two-way communication. Hand gestures were identified and used as alternatives to verbal communication for needs within the operating room.

This case series describes what could be a new frontier in lung transplantation if long term results prove to be comparable with other etiologies of end stage lung disease. SOFA score greater than 8 at the time of ICU admission after lung transplantation has been identified as an independent predictor of 90-day mortality <sup>1</sup> It will be very interesting to see if these patients with relatively high SOFA scores pre- transplant survive past the 90-day mark and then if so, what sets their pathophysiology apart to allow that. Obstacles presented by occupational safety needs are also unique. These obstacles represent opportunity for the development of enhanced communication technology within the operating room and create an even greater reliance on the intraoperative interdisciplinary team model. I look forward to future publications involving lung transplantation in this unique patient population and am excited to see where this opportunity may take us.

Reference:

1. Rello, J, Bello I, de Vicente R, Anchuelo AH, Ballesteros MA, Iranzo R, Rellan L, Riera J, Robles JC, EMPRET study investigators. Risk Factors for Mortality in 272 Patients with Lung Transplant: A Multicenter Analysis of 7 Intensive Care Units. *Ach Bronconeumol.* 2017; 53(8):421-426.