

# Commentary on “Lung Transplantation for COVID-19 Pulmonary Sequelae”: Beautiful Story, Already History?

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In their article “Lung Transplantation for COVID-19 Pulmonary Sequelae,” Shigemura et al describe 20 lung transplant (LT) cases during a 16-mo period for coronavirus disease 2019 (COVID-19)–related lung failure.<sup>1</sup>

Although the first COVID-19 cases were reported in December 2019, the first LT for COVID-19 was performed very early in the pandemic: in China on February 10, 2020,<sup>2</sup> and in Italy and Austria on May 17, 2020.<sup>3,4</sup> So far, LT has not been a treatment option in acute respiratory distress syndrome or only in case reports. However, this pandemic was responsible for many isolated respiratory failures in previously healthy young patients, and the issue of LT arose.

Although involving patients with important comorbidities, which could be considered as major contraindications for LT by many other teams, the results reported here are excellent with only 1 lately death. We can only admire such results.

This may raise several questions. First, what is the weight of the original disease in the posttransplant course? Perhaps the deconditioning associated with an intensive care unit admission for an acute disease such as COVID-19 acute respiratory distress syndrome (CARDS) has less consequence than many years of progressive deconditioning after a chronic illness such as chronic obstructive pulmonary disease. It would be interesting to measure and compare such deconditioning. Future research works evaluating frailty or surrogates such as sarcopenia could help understand this issue.

Second, these excellent results are coherent with those previously published by other teams.<sup>5,6</sup> This could be explained by a selection bias; ultra-trained teams performed LT to highly selected patients who received meticulous care. However, the applicability of these results in widespread use of LT for CARDS is not warranted. We can also imagine a publication bias, less exciting results not being published by the responsible teams.

The third major question is the delay between COVID-19 infection and LT. We know that recovery is reported in many acute respiratory distress syndrome patients, including after CARDS,<sup>7</sup> but the delay for a vain hope is not determined. On the one hand, if the waiting time is too long, the patient risks being completely deconditioned, even if, as mentioned previously, nobody knows how to measure this deconditioning and its consequences. On the other hand, a too-rapid decision might lead to futile LT, as suggested here, in which several mono-LT patients demonstrated an improvement of their native lung function during follow-up. In this series, the authors performed preferentially single LT to minimize their surgical burden, but this could also be considered as a “bridge to recovery” of the contralateral lung, as evoked by King et al.<sup>8</sup>

We understand the enthusiasm of transplant teams but can only recommend caution. For over 150 million people infected, of which >7.5 million patients had a severe form of COVID-19 in the past 3 y,<sup>8</sup> hundreds of transplants are anecdotal and should not be considered a reference treatment. The medium- and long-term future is unknown. There is a great geographical disparity in the number of LT for CARDS: several series have been performed in North American transplant centers,<sup>5,6</sup> whereas few have been performed in Europe. Moreover, in the context of organ shortage, this can lead to complex situations, such as the transplantation of 2 lobes, given by 2 living donors in a Japanese clinical case.<sup>9</sup>

In terms of public health and ethics, we can question whether the particular interest of these patients prevails over the general interest. LT is a heavy treatment that mobilizes a lot of human and material resources, and in certain periods of the pandemic, finding a resuscitation bed was difficult: would it be legitimate to occupy a bed for a post-COVID-19 LT? Who should be given priority on the LT list, which will mechanically grow because of this new indication? This is still a debate.<sup>10</sup>

It is hoped that these questions will be resolved with the effectiveness of the vaccines. Indeed, it seems obvious

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to us that it would be unethical to offer LT, which implies rigorous medical follow-up, excellent therapeutic compliance, and trust in the healthcare team, to patients who have refused to be vaccinated against COVID-19. Because vaccines are effective in preventing the occurrence of severe COVID-19,<sup>11</sup> there should be no further indication (or scarce residual indications) for LT for COVID-19 sequelae.

In conclusion, LT seems to be a therapeutic option for COVID-19, only in selected patients, by trained teams, and in a favorable epidemiological context. The optimal timing remains undetermined. We can hope that LT for COVID-19 sequelae is already history thanks to massive vaccination. Nevertheless, the lessons learned from this experience, as the one given here by Shigemura et al, should be precious kept for the future. Finally, time will tell whether LT is a reasonable option for CARDS.

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