



Urgent listing for lung transplant—a double-edged sword!

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Benedetto *et al.* (1) present a case of successful urgent lung transplantation in a patient with rapidly progressive interstitial lung disease (RPILD), specifically anti-MDA5 pulmonary scleroderma, which prompts many important questions about the approach to such patients. As the authors have noted, there has been a stigma around lung transplantation for patients with systemic sclerosis (SSc) due to perceived challenges both intraoperatively and in postoperative care. Overall transplantation rates for this group remains small with the International Society for Heart and Lung Transplantation (ISHLT) reporting connective tissue disease (CTD) accounting for 0.9% of all lung transplants in 2019, and SSc being a small portion of that number (2). Patients are at risk for many extrapulmonary manifestations of SSc, including cardiac, renal, gastrointestinal, and vascular pathologies, that should ideally be identified and formally evaluated prior to transplantation. These extrapulmonary manifestations may place the patient into absolute or relative contraindications to lung transplant per the ISHLT consensus document (2). However, recent evidence has demonstrated that short- and long-term survival in lung transplant for SSc are similar to patients with pulmonary fibrosis. Crespo *et al.* found 1-year survival of 81% for SSc *vs.* 79% for interstitial lung disease (ILD) and 5-year survival (conditional on 1-year survival) of 66% for SSc *vs.* 58% for ILD (3). This was supported by a similar result reported by Miele *et al.* showing 1-, 3-, and 5-year survival of 94%, 77%, and 70% in their SSc population which was not statistically different

than comparison groups (4). These single-center reported outcomes have been replicated across multiple institutions including appropriately selected SSc patients with both predominantly ILD (SSc-ILD) and those with pulmonary artery hypertension (SSc-PAH) (5).

The second aspect of this case worth considering is the decision to list and perform an urgent lung transplant. The ideal lung transplant candidate has been followed for some time with a referral for evaluation early in their disease process allowing for determination of disease trending. During this assessment frailty and psychosocial support and barriers may also be identified (6). The coronavirus disease 2019 (COVID-19) pandemic, in combination with previous influenza outbreaks, has provided evidence towards the feasibility of lung transplant for acute respiratory distress syndrome (ARDS) with patients on mechanical ventilation and/or extracorporeal membrane oxygenation (ECMO) support. Yeung *et al.* have published a case series of patients undergoing lung transplantation for acute COVID-19 at the Toronto Lung Transplant Program (7). In this series 3 relatively young male patients (ages 48–60 years) all presented with acute COVID-19 infections that progressed to requiring veno-venous (V-V) ECMO support. In one scenario, the patient had discussed lung transplantation prior to his clinical deterioration. In all cases the patient was stabilized on V-V ECMO and able to participate in physiotherapy prior to listing. Their institutional experience emphasizes the importance of single-organ failure, the ability to provide informed consent, and participation in

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physiotherapy as keys to success in transplantation for patients with ARDS. A similar case reported by Madurka *et al.* concerned a 37-year-old female with ARDS due to a cryptogenic organizing pneumonia that underwent bilateral lung transplantation after approximately one month of V-V ECMO support (8). While the patient was initially weaned from ECMO and supplemental oxygen support following the operation and discharged home, she returned with worsening respiratory function and ultimately died 179 days after surgery. There are many other aspects of this case that differ from the patient with RPILD being discussed but does show the relatively greater potential for failure following lung transplantation that makes patient evaluation and donor selection crucial, both to maximize patient benefit and to appropriately allocate a limited resource. Urgent listing for lung transplantation has previously been demonstrated to provide similar outcomes to elective listing (9). In this retrospective analysis by Tang *et al.*, 201 patients underwent urgent listing for lung transplantation (9). Sixty-six (33%) of these patients died on the waitlist with the majority of the deaths occurring within the first month. One hundred and thirty patients eventually underwent lung transplants with similar post-transplant survival as matched cohort in the elective group. They report 1-year survival around 80%. The highest risk of death in the urgent listing group came within 2 weeks of transplantation.

One consistency across the literature is the high mortality rate of ARDS requiring mechanical ventilatory or ECMO support. These are sick patients that have poor outcomes even with maximal medical therapy. While medical therapies for interstitial lung disease continue to evolve along with our understanding of the complex pathologies, lung transplantation remains the ultimate end-therapy for patients with refractory disease. Acute exacerbations requiring hospitalizations and the consideration of urgent listing remain difficult to manage from a medical, ethical, and resource management perspective. The growing body of evidence that acute exacerbations of ILD can be managed with lung transplant with similar outcomes to stable patients with end-stage ILD (10).

At our institution, we emphasize patient participation in decision-making and physical therapy prior to listing. Even in the urgent setting, the goal is to wean the patient from sedation and mechanical ventilation if being supported by V-V ECMO. We have growing experience utilizing ambulatory ECMO to minimize the burden on movement and physical, occupational, and respiratory therapy teams

that are comfortable working with patients on ECMO. Our parameters are, the patient being able to walk 30-feet at minimum prior to listing, ability to be awake, understand the process of evaluation and listing for transplantation and be able to consent. We also focus on single-organ failure and engage the patient and family as soon as transplantation is being considered. Acute respiratory failure is exceptionally difficult to manage and listing for lung transplantation on an urgent basis should not be taken lightly. It is beneficial to encourage patient participation in the process early and often to ensure appropriate preoperative expectations that can guide postoperative recovery.

We would like to commend the authors for their achievement while emphasizing a cautious approach to listing patients for lung transplant on an urgent basis. A multidisciplinary team approach is perhaps the best way forward to optimize resource utilization and patient outcomes.

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