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Commentary: How best to dance tango in lung transplantation for chronic obstructive pulmonary disease?

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It takes 2 to tango is a common expression suggesting that 2 partners are required to dance in relation to each other—either next to each other in tandem or in opposition to each other (Figure 1). The debate on the best transplant type for patients with nonsuppurative parenchymal diseases continues.¹⁻⁴ A suitable pair of lungs from a single donor may go to 1 recipient for double-lung (DL) transplantation (with lungs in tandem) or may serve 2 twin recipients for single-lung (SL) transplantation (with lungs in opposition).

Chronic obstructive pulmonary disease (COPD) remains a common indication to improve quality of life over quantity of life.⁵ The lung allocation score (LAS) implemented in the United States in 2005 assigns lower values to patients with COPD, who are considered less urgent than patients with other transplant indications.⁶ Consequently, of all procedures, COPD as a transplant indication halved from $\pm 50\%$ during 1992-2000 to $\pm 25\%$ during 2010-2018.⁵

To improve waitlist survival probability for patients with COPD, transplant centers may prefer a policy of unrestricted listing (ie, SL or DL upon first suitable offer). This policy brings up the question of whether pre- and post-transplant survival probability would differ between SL versus DL for a given recipient.

Splitting a double-lung bloc: 2 lungs for 1 patient or 1 lung each for 2 twin recipients?

CENTRAL MESSAGE

Lung transplantation for COPD offers a survival advantage in the United States if you are listed exclusively for double-lung or are just lucky to get both lungs allocated at the time of donor offer.

Hull and colleagues⁷ from Massachusetts General Hospital in Boston report the outcome of a retrospective analysis of both waitlist and posttransplant survival in patients with COPD using post-LAS data from the United Network for Organ Sharing (UNOS) between 2005 and 2018. Nearly 80% of listed patients underwent transplant, whereas 4.87% died while waiting and another 4.75% were removed due to clinical deterioration. In patients listed as unrestricted (n = 3867) versus restricted for DL transplant type only (n = 3051), mortality while waiting was significantly lower (4.0% vs 5.9%; $P < .001$) with better median survival (6.09 vs 4.39 years; $P = .002$). Waitlist mortality was influenced by female sex, elevated pulmonary artery pressure, and longer waiting time. Whereas restricted listing carried an increased risk (hazard ratio, 1.34) for mortality while waiting, posttransplant survival was better after DL versus SL (median survival, 6.5 vs 5.3 years and 10-year survival, 33.8% vs 21.6%, respectively; $P < .001$). Survival advantage after DL (hazard ratio, 0.819) persisted in adjusted analysis with recipients being younger, male patients with a higher LAS.

This report is currently the largest investigating waitlist mortality in patients with COPD while comparing post-transplant survival between SL and DL recipients. In contrast to the Model for End-Stage Liver Disease score to assess urgency in liver transplant candidates, estimated posttransplant survival is also incorporated into the LAS

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FIGURE 1. It takes 2 to tango. Should we do this dance in tandem (1 double lung) or in opposition (2 single lungs)? (Picture available in the public domain: <https://blog.lewolang.com/images/1328a60db7c7d2712096894b9d165acb.jpg?w=800&h=600&fit=crop>, accessed December 17, 2021.)

to balance with waitlist survival probability counting twice as much.⁶ Therefore, the most important question remains unanswered: Is transplant benefit of combining waitlist plus posttransplant survival in patients with COPD superior after DL versus SL? To estimate this individual benefit, the authors should have compared survival from the date of listing, a promise made in their reply to the reviewers' comments. Also, the societal benefit in terms of life-years saved for all listed patients with COPD should be calculated. In an earlier UNOS study by Bennett and colleagues,³ no difference in 5-year posttransplant survival for DL versus SL was identified. However, saved life-years was significantly longer if donor lungs were split for 2 SL recipients.³ However, in a study by authors from Duke University, the second donor lung going used in the United States dropped from 100% in 1987 to around 60% in 2011.⁸ This may well reflect that donor profiles changed over the years, with fewer good quality lungs from extended-criteria donors. In our experience, donor lungs with older age, radiographic infiltrates, airway secretions, or lower oxygenation capacity may still result in good outcome in DL recipients, whereas a perfect donor lung is needed for an SL recipient to avoid ventilation/perfusion inequalities complicating the early posttransplant course.

COPD is still a common transplant indication in Europe, with about 35% of all procedures reported in the past decade.⁵ In many countries, besides high-urgency exceptions, donor lung allocation is still based on accrued waiting time. In Eurotransplant, the organization distributing organs between 8 European countries, national allocation of donor lungs with LAS only occurs in Germany and the Netherlands. Notably, both member states report the lowest percentage of organs donors per million population in Eurotransplant.⁹

COPD seems a forgotten etiology in the post-LAS era. The authors therefore make a plea to incorporate a body mass index, airflow obstruction, dyspnea, and exercise capacity score into the LAS, adding those 4 objective parameters to better assess mortality risk in patients with COPD.¹⁰

Despite its current shortcomings, this retrospective UNOS database study by Hull and colleagues⁷ stirs up the ongoing debate on the best transplant type for patients with COPD. We look forward to their follow-up report comparing individual and societal transplant benefit between SL and DL from date of listing. In our opinion, DL remains the preferred transplant type in selected patients with COPD yet to be challenged by more data.

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