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Commentary: Factors associated with short- versus long-term survival following lung transplant: Not yet the LAsT word in organ allocation

K. Candis Jones, MD, MS, and Andrew C. Chang, MD

Jawitz and colleagues¹ uniquely parse United Network for Organ Sharing survival data to show that factors associated with short-term (<1 year) survival were not similarly associated with long-term survival. Long-term survival, defined as >10 years, is associated positively with lower donor age and bilateral lung transplant. Although associated with early survival, the Lung Allocation Score (LAS), implemented in 2005, was not a significant determinant of long-term survival. In multivariable analysis that included the LAS deconstructed into its covariates, only baseline characteristics, that is, pre-transplant recipient age and percent-predicted forced vital capacity, were associated with survival beyond 10 years. This was in contrast to numerous factors associated with early mortality, including recipient LAS. Bilateral lung transplant was associated with improved survival both at 1 year and 10 years, conditional upon recipient survival beyond 1 year.

This article highlights the limitations of large registries for their lack of granularity to identify clinically meaningful factors associated with lung transplant survival. With improvements in patient selection, identification, and management of early postoperative complications, surgical techniques, and immunosuppression regimens, early mortality following lung transplant has declined.² It is encouraging that more patients are experiencing longer-term survival, with more than 26% living beyond 10 years after lung transplantation. The barriers to improving survival that remain are inherently more complex and can be difficult to discern from registry

K. Candis Jones, MD, MS (left), and Andrew C. Chang, MD (right)

CENTRAL MESSAGE

Although the UNOS registry can identify risks associated with early (<1 year) mortality, such registry data might not be sufficient for defining factors related to longer-term survival.

databases. Long-term graft durability likely reflects donor and recipient characteristics, comorbidities, rejection burden, medication compliance, and psychosocial and socioeconomic factors. Not only are such factors difficult to quantify, but many also can be difficult to capture over extended periods of follow-up. Although causes of death, stratified by duration of transplant survival, were reported, the authors did not explore further the association between survival and disease states such as chronic lung allograft dysfunction and its obstructive manifestation, bronchiolitis obliterans syndrome, possibly due to incomplete data. This gap is consistent with the recent observation that chronic lung allograft dysfunction and bronchiolitis obliterans syndrome also are not completely captured in the well-established International Thoracic Organ Transplant Registry maintained by the International Society for Heart and Lung Transplantation.³

Although the findings of Jawitz and colleagues¹ provide further validation for the intent of the LAS; that is, to reduce waitlist deaths and balance 1-year mortality,⁴ their report indicates that the LAS composite lacks that same association with longer-term survival. This is not to identify any flaw in the intent of this allocation strategy but instead to emphasize the need for further study of a unique cohort of transplant survivors. The authors remind us of the challenges ahead to improve survival further to meet that of other solid organ transplants. Although far from the last word on donor lung allocation, their work provides a foundation for improving our

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understanding of long-term survivorship following lung transplantation.

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Commentary: Ten-year survival, the holy grail in lung transplantation

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Despite continued advancements in recipient selection, immunosuppression, and post-transplant care, lung transplantations continue to have the worst survival of all solid organs.¹ However, there has been progress with recent reports demonstrating improvements in long-term survival in the recent era.^{2,3} The factors associated with long-term survival to 10 years and beyond remain poorly understood, and their identification is an active area of investigation.

Jawitz and colleagues⁴ seek to fill this knowledge gap by identifying factors associated with short-term (1 year) versus long-term (10 year) survival. Using the United Network for Organ Sharing database, the authors examined numerous donor and recipient factors collected at the time of transplant. Early mortality was associated with donors who were Black, who smoked tobacco, and who had impaired gas exchange. Recipient factors associated with

Waitlist and first year post-transplant mortality are driven by similar factors; however, predictors of 10-year overall survival are not as well known.

CENTRAL MESSAGE

Dynamic post-transplant events may be better predictors of long-term survival in lung recipients compared with pretransplant recipient and donor factors.

early mortality included higher lung allocation scores, extracorporeal support, and single lung transplant. This study adds to the literature of peritransplant variables predicting early survival. The lung allocation score, which uses many of the factors that were used in this study, was really designed to adjudicate waitlist mortality and early post-transplant survival. The first part of this study essentially validates current allocation and selection practices.

Although analyzing predictors of early outcomes in transplantation is valuable, we do not perform transplantation with the aim of 1-year survival in patients. We perform transplantation hoping for long-term survival. To that end, Jawitz and colleagues⁴ tried to elucidate factors associated with longer-term (10-year) survival. Finding novel donor/recipient features that prognosticate longer-term survival would have been really interesting except they did not

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