understanding of long-term survivorship following lung transplantation.

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

Ramiro Fernandez, MD, Jesse Rappaport, MD, and Usman Ahmad, MD

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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find many. Only donor age and single versus bilateral lung transplantation were associated with long-term survival. It seems the risk imparted by donor/recipient characteristics at the time of transplant diminishes beyond the first year after transplant and becomes secondary to post-transplant determinants of graft function.

To understand the drivers of long-term survival, we should focus on the role of dynamic post-transplant events. These include the near universal episodes of rejection and infection, and over the long term immunosuppression-related renal dysfunction and diabetes.⁵ These dynamic post-transplant variables likely have greater impact on long-term survival than factors at the time of transplant. To improve long-term outcomes, we must establish evidence-based best practices for diagnosing and managing these events. For example, there is growing evidence that trends in spirometry post-transplant are associated with long-term survival.^{6,7} However, there is limited knowledge of how factors such as donor smoking, size mismatch, and gastroesophageal reflux disease affect spirometry trends. To better evaluate these dynamic post-transplant variables, individual center data may provide a more granular approach compared with large databases. Perhaps a multi-center study with granular evaluation of such characteristics could provide a more robust analysis.

Understanding the role that dynamic post-transplant variables play in long-term outcomes is essential to guide future studies and potentially uncover targeted interventions so we can make 10-year survival the norm and not the exception in lung transplantation.

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Commentary: Pleasure is bought at the price of pain

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In this issue of the *Journal*, Jawitz and colleagues¹ report a retrospective study using a large UNOS database to identify

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CENTRAL MESSAGE

Most of the risk factors of early mortality after lung transplantation, such as donor PaO₂/FiO₂ ratio and recipient lung allocation score, are not associated with long-term survival.