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Reply to the Editor:

We thank Dr Robicsek for his interest in our article.

The average age of our overall donor population was 38 years in this series; 65 years is the median age for the group of donors aged 60 years and older.

We agree that the predicted life expectancy of a 60-year-old can be excellent. In fact, we do not have any age limitations for the selection of recipients in our program. At the time of this publication, the average age of our recipients was 45 years. However, 78 recipients were 60 years and older, and the oldest recipient was 74 years old at the time of the transplant in our experience.

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Independent lung ventilation in adult single-lung transplantation: Is it time for fast-track anesthesia and early tracheal extubation?

To the Editor:

I read with great interest the recent article by Pilcher and colleagues¹ detailing their experience with independent lung ventilation (ILV) in adult single-lung transplantation for chronic obstructive pulmonary disease (N = 170; 1990–2005). The incidence of ILV was 12% (20/170); the 2 multivariate predictors were preoperative percentage predicted total lung capacity (odds ratio 1.04; confidence intervals 1.01–1.07; $P = .032$) and postoperative reduction in the arterial oxygen tension/inspired oxygen fraction ($\text{PaO}_2/\text{FiO}_2$) ratio (odds ratio 0.97; confidence intervals 0.95–0.99; $P = .005$). The mortality rate in the ILV subcohort was 40% (8/20) as compared with 4.7% (7/150) for the rest of the cohort ($P < .001$).

Which interventions might minimize the serious complication of ILV? What about mechanical ventilation in the pathogenesis of

early graft dysfunction, given the inherent compliance mismatch? High preoperative total lung capacity would aggravate the compliance mismatch and consequent donor lung stretch and injury. Postoperative reduction in the $\text{PaO}_2/\text{FiO}_2$ ratio reflects lung edema and injury. Is there evidence for a link between mechanical ventilation and graft function in this clinical scenario?

The duration of perioperative mechanical ventilation in single-lung transplant recipients contributes to early graft edema and dysfunction.² Early tracheal extubation is feasible in single-lung transplantation: a successful extubation protocol includes formal criteria, short-acting anesthetics, thoracic epidural analgesia, and intermittent application of noninvasive positive-pressure ventilation as required.^{2,3}

As a result, it would be most interesting to see what effect this consideration would have on the data sets in the study by Pilcher and colleagues. Was there an evolution in anesthetic technique over the 15 years of the study? Was the incidence of ILV influenced by anesthetic technique and timing of tracheal extubation? Perhaps the answers to these questions could be the focus for a subsequent study.

I congratulate Pilcher and colleagues on a thought-provoking study. Their research, taken together with earlier studies, suggests the following future directions for clinical outcome studies in this field: (1) validation of the safety and success of early tracheal extubation in single-lung transplantation and (2) determination of the effects of fast-track anesthesia with early tracheal extubation on graft function in the setting of pulmonary compliance mismatch.

If the effects of fast-track anesthesia with early tracheal extubation are favorable, it will progress to become the standard of care for single-lung transplant recipients, especially in the setting of compliance mismatch and chronic obstructive pulmonary disease.

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Reply to the Editor:

We thank Augoustides for his comments and thoughts about our article.¹ He notes the high mortality rate of those undertaking independent lung ventilation (ILV) and suggests that trials assessing early extubation with appropriate anesthetic modification may be a solution. Clearly in this retrospective case series we cannot assess causation; that is, we cannot say whether the use of ILV was actually harmful, nor whether in balance it increased mortality. We would contend that when ILV was initiated, patients had reached a point at which they could not be sustained without ILV (or in later years extracorporeal membrane oxygenation).

Mechanical ventilation is only justified when its benefits outweigh its risks. Inappropriately high tidal volumes are known to be harmful to lungs with adult respiratory distress syndrome, with an adverse effect on mortality.² This is also likely to be true for lung transplants. It has been our clinical experience that increased mechanical ventilation in the single-lung transplant with excessive dynamic hyperinflation and primary graft failure leads to increasing dynamic hyperinflation within the native lung and subsequent cardiovascular collapse. However, it is possible that there is also direct injury to the transplanted lung from inappropriate mechanical ventilation.

Delineating this can be difficult because, owing to the contribution of the native lung, a healthy patient with a functioning single graft has a lower arterial oxygen tension/inspired oxygen fraction ($\text{PaO}_2/\text{FiO}_2$) ratio than that of a "similar patient" with a double-lung transplant. At extubation, single-lung transplants have lower $\text{PaO}_2/\text{FiO}_2$ ratios than double-lung transplants.³ The intermediate outcomes in these 2 groups are similar. It has been suggested that the definition of primary graft failure should be changed to reflect this.⁴

Since the program began at the Alfred Hospital, there have been many advances in all aspects of lung transplantation. An-