Death after lung transplantation

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INVITED COMMENTARY

Death after lung transplantation: improving long term survival despite perilous early postoperative years

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Many centers showed that since they started a lung transplantation program, overall survival improved every 5- or 10-year cohort. This is also seen in combined international data [1]. Many changes in donor selection, organ preservation, and perioperative management improved short-term survival despite the usage of extended criteria donors. In parallel, also long-term survival improved, likely because of gained experience and better anticipation on developing diseases after transplantation. A current relative standstill in the arsenal of medication directed on the prevention of (chronic) transplant dysfunction hampers further survival improvement. Lung transplant patients still have a shorter life expectancy than normal, especially caused by side effects of immunosuppression and our inability to stop chronic deterioration of the graft. Malignancies are an emerging cause of death besides the still persistent chronic lung allograft dysfunction (CLAD).

This, till now inevitable, downside of the success of lung transplantation is well described in the paper of Raskin *et al.* [2] in this issue. This paper focused on how death cause and death burden changed over the years in a program with improving results. Intriguing is that the patients that do die still die after a median period of 3 years, across all primary diseases. This suggests that their death is not prevented by current anti-rejection and infection protocols that have hardly changed over the years in lung transplantation.

This paper suggests room for improvement and polishing of treatment protocols, preferentially in the first postoperative years. Moreover, by virtue of its descriptive nature, the paper inevitably raises a number of questions to causes and variables that lead to mortality in this patient group. The influence of recipient age and type of immunosuppression is mentioned in the discussion, but not extensively

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described. However, in a number of single-center studies an evident relation between type of immunosuppressive drugs and long-term outcomes such as survival, renal function, and skin cancer, both in maintenance setting [3,4] or after conversion of drugs [4], has been described.

For this reason, the current paper justifies further study in European context, involving medium-to-large volume centers with state-of-the-art long-term results. Focus of interest may be:

- Incidence and type of cancer in relation to type and, particularly, target levels of immunosuppression
- Risk of lung cancer in relation to bilateral vs. unilateral lung transplantation
- Cardiovascular risk in relation to recipient age and pretransplant vascular condition
- The influence of primary disease on the mode of death. Especially, the high number of deaths by infection after transplantation for fibrosis needs brother analysis.

Raskin *et al.* [2] show that the balance in protection and harm by the current used protocols in their program is not optimal as it is in all programs. The deviation of the survival curves of the last two 5-year cohorts in their study might indicate that this improvement has started. For real improvement, focus of research on protocols and new drugs should be aimed at preventing CLAD with less side effects.

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Conflicts of interest

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