Optimizing future lung transplant outcomes: asking the right questions for an alternative truth

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Ther Adv Respir Dis

2020, Vol. 14: 1–4

DOI: 10.1177/1753466619897879

The excellent review on ‘Optimal strategies for referral and patient selection for lung transplantation’ by Mitchell and Glanville in the latest issue of *Therapeutic Advances in Respiratory Diseases*[1] accurately describes the important historic changes in referral and listing strategies, driven by experience and increasingly also by scientific evidence, aiming to achieve the ‘best’ results after lung transplantation. We would, however, like the readers also to contemplate on this issue from an alternative perspective. Thus, let us consider three of our patients, at least 10 years after lung transplantation.

Mr V is a 72-year-old retired businessman who underwent bilateral lung transplantation for pulmonary fibrosis 11 years ago. He has stable chronic kidney disease stage 3b, was treated for basal cell skin carcinoma 6 years ago, had percutaneous coronary intervention for ischaemic heart disease 4 years ago and a recent transient ischaemic attack secondary to vascular–ischemic brain lesions. He is enjoying family life together with his grandchildren, loves gardening and traveling abroad.

Ms O is a 64-year-old widow and former employee who never returned to work after being transplanted for emphysema 11 years ago. Owing to chronic lung allograft dysfunction (bronchiolitis obliterans syndrome) she suffers from respiratory insufficiency, requiring supportive medical therapy, long-term oxygen treatment and nightly non-invasive ventilation. She has a normal kidney function, but heart failure with preserved ejection fraction and is obese (body mass index of 30.1), which, together with her age, disqualifies her for retransplantation. Despite being included in a palliative care tract, she is involved in a physical rehabilitation program to maximize her self-care capacity and independence at home. The prospect of dying, however, makes her fearful.

Ms S is a 49-year-old and was transplanted for delta F508 homozygous cystic fibrosis 11 years ago. She had an uneventful post-transplant course, without any unplanned hospitalizations over the past 5 years. She developed non-insulin-dependent diabetes mellitus, but has a normal kidney function and preserved pulmonary function without evidence of chronic lung allograft dysfunction. She obtained a bachelor’s degree and is willing to work, yet is unemployed and has difficulties obtaining life insurance for a mortgage as several employers and insurers consider her health to be too high a risk, which profoundly depresses her, leading her to question why she previously consented for transplantation, leading to suicidal thoughts.

Which of these outcomes should we consider to be the ‘best’ result, if any? According to the most recent consensus statement of the International Society for Heart and Lung Transplantation (ISHLT),[2] lung transplantation nowadays should be considered for patients with end-stage lung disease meeting all of the following general criteria.

1. High (>50%) risk of death from lung disease within 2 years if lung transplantation is not performed.
2. High (>80%) likelihood of surviving at least 90 days after lung transplantation.
3. High (>80%) likelihood of 5-year post-transplant survival from a general medical perspective, provided that there is adequate graft function.
4. Acceptably low number of contraindications and comorbidities following thorough evaluation.

Of course, adequate patient selection and risk management is paramount, as skilfully outlined

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by Michell and Glanville. However, considering these criteria, everybody would probably consider all of these cases a 'success', given their excellent long-term survival, contrasting that of their nontransplanted counterparts. Nevertheless, patients indisputably have priorities other than simply being alive; and pursue a fulfilling life, not only physically, but also psychologically and socially. Hence, healthcare professionals and their patients have the common goal to achieve a life after transplantation 'as normal as possible', 'for as long as possible'. Nowadays, 1 year post-transplant survival metrics therefore simply cannot be sufficient as mere indicators of success.[3] After all, 1 year survival in experienced (usually high volume) transplant centres nowadays is close to, or at least should be pursued to be, 90%.[4] Accepting inferior 1 year outcomes are actually hard to defend, given the growing disparity between the number of organ donors on the one hand and the number of listed transplant candidates on the other hand, a logic result of the historic success of (lung) transplantation. Moreover, contemporary long-term outcomes are increasingly satisfactory in many lung transplant centres, with 5- and 10-year survival rates of at least 70% and 60%, respectively,[5,6] again reflecting the extraordinary medical progress and new therapeutic modalities since the first successful human lung transplant was performed only 55 years ago (survival of 18 days).

From these encouraging long-term survival data in the recent era it becomes clear that the majority of transplant recipients nowadays, and even more so in the near future, will endeavour on a long transplant journey, yet during which many medical and other problems may be encountered. Indeed, infections, renal dysfunction, diabetes mellitus, malignancies and above all chronic lung allograft dysfunction are the most important contributors to morbidity, affecting most lung transplant recipients 5–10 years after transplantation.[5,7] Of course, these disorders not only affect the patients' physical health, but will also affect their functional status, quality of life and ultimately the healthcare budget, which is inadequately captured by current healthcare practices and health insurance policies. Thus, healthcare providers, regulatory health authorities and insurers should begin to focus on lasting, all-inclusive healthcare after transplantation. However, what are the questions we should ask and what are the key solutions to make this work?

An alternative care model, aiming to accompany patients and their close relatives on their transplant journey from prior to transplant until the patient dies after, hopefully, a long and prosperous life, may be essential for this, in line with the 2016 World Health Organization (WHO) report on integrated healthcare.[8] Such a '21st century chronic care model' would 'take into account broad determinants of health and focus on a system of coordinated interventions across different types, levels and settings of care, extending actions beyond clinical intervention towards health promotion, prevention, screening and early detection, management of diagnosed cases, rehabilitation and palliative care'. This implies reengineering current transplant care, placing the needs of patients and their relatives at the heart of clinical practice, based on, at the minimum, the following building blocks: (i) ensuring access and continuity of care, (ii) maximizing opportunities for patients and their relatives to participate in their care process, and (iii) providing continuous self-management support.

Currently, transplant professionals, but also transplant registries, program directors, hospital managers, policy makers and insurers, still almost exclusively focus on acute peri-operative and early post-operative outcomes, after which period patients are mostly referred back to their local medical practitioner for follow-up. Integrated care is basically all about asking the right questions and necessitates a multidisciplinary team, enabling physicians, nurses and allied health professionals to identify the patients' values, to reflect upon the meanings and consequences of serious illness scenarios, to define goals and preferences for future treatment and care, including end-of-life decisions; which issues should be discussed regularly with the patient, the family and other healthcare providers during continued follow-up. One could wonder whether local healthcare providers, not attending to many transplant patients on a regular basis, may gain sufficient expertise to adequately manage all long term transplant-specific challenges, which may also be true for low-volume transplant centres, as demonstrated by their significantly higher 5-year mortality.[7] Future integrated care might allow to better manage transplant-specific comorbidities; and to determine its effect on patients' health-related quality of life, or *vice versa*. Indeed, factors such as depression, medication nonadherence and lifestyle issues are increasingly recognized to cause comorbidity and to negatively affect post-transplant survival.[9] This would, however, require identification of a set of standardized outcomes, based on transplant recipients' priorities, along with instruments and time points for measurement and risk adjustment factors, such as these currently are developed for various other conditions by the International Consortium for Health Outcome Measurement (ICHOM).[10] Consequently, all transplant recipients could benefit from self-management support,[11] allowing them to make informed choices about managing the complex therapeutic regimen, coping with symptoms and emotional consequences of having a chronic condition; and taking up meaningful roles on the job market and in social life. Preliminary findings in patients with chronic obstructive pulmonary disease show that such integrated chronic care models do not only result in in higher patient satisfaction and quality of life, but also in better clinical outcomes.[12]

So, what makes a transplant a success? *Being* alive may be the start, but the truth is that, both now and in the future, *being alive well*, preferably for many years, should be the aim. Investing in an alternative, integrated healthcare model might serve both purposes. And it would help if this could be achieved at a reasonable cost, for instance by (re)allocating scare resources, valuing long-term quality-based care; but perhaps we, as a transplant community and as society, are currently just asking the wrong questions for this?

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: RV is a senior clinical research fellow of the Research Foundation Flanders (FWO), Belgium. GMV is supported by a research grant of KU Leuven, Belgium (C2/15/030). However, this manuscript received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interest statement

None of the authors of this manuscript have any conflicts of interest to disclose in relation with this manuscript. The authors confirm that that the work described has not been published previously, that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form in English or in any other language, without the written consent of the copyright holder.

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