

## Editorial Comment

# Heart and Lung Transplantation: New Flavours from Old Recipes

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**Heart transplant, lung transplant, mechanical circulatory support, left ventricular assist device (LVAD).**

**T**his issue of the Hellenic Journal of Cardiology includes an article by Manginas et al, titled Orthotopic Heart Transplantation: Ten Years' Clinical Experience.<sup>1</sup> In it the authors present a decade's experience from the Onassis Cardiac Surgery Centre (1996-2006), which at the same time is also representative of the pan-hellenic experience in this field over the same period. The results the authors describe are indeed excellent. I would like to use the occasion of this article's publication to offer a brief analysis of recent international experience.

### Numbers of transplants

The number of thoracic transplants has seen an increase in recent years (2002-2006) at the international level, despite the fact that the number of heart transplantations has continued to follow a descending curve since the middle of the last decade, both in the registry of the International Society for Heart and Lung Transplantation (ISHLT) and in the USA registry.<sup>2,3</sup> The year with the most heart transplants in the ISHLT registry was 1994, with 4439 transplants. Since then there has been a steady reduction every year, with the sole exception of 2005, when there was a small increase compared to 2004 (3095 versus 3026) (Figure 1). Of course, the numbers in the ISHLT registry do not precisely represent the reality worldwide, since many centres do not report their results to

the Society. In 2004 it was estimated that the number of heart transplants that were not entered into the ISHLT registry was more than 2000 per year. Adding this to the 3000 ISHLT registered transplants indicates that the annual heart transplant productivity must exceed 5000. I should note that the Onassis Cardiac Surgery Centre reports its transplants to the ISHLT registry.<sup>1-3</sup>

In recent years the number of lung transplants has seen a spectacular increase, reaching 2169 in 2005 in the ISHLT registry and 1407 in the USA registry. This increase was due to a tripling of the number of bilateral lung transplants (BLT) since 1994, while the number of single-lung transplants (SLT) remained stable (Figure 2). The increase in the number of BLT was probably attributable to the better patient survival compared to SLT, or to the better respiratory function that BLT patients demonstrate.<sup>1-3</sup>

The number of heart-lung transplants has remained steady and small (75-83 per year) since 2002. Of course, the role of heart-lung transplantation continues to be important for patients with congenital heart diseases and primary pulmonary hypertension.<sup>1-3</sup>

In Greece, lung and heart-lung transplantations have not been performed in recent years.

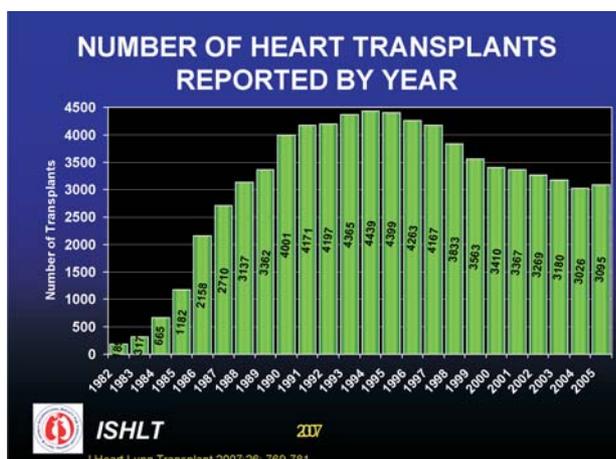
### Waiting list

The number of patients on the waiting list for heart transplantation and the number of

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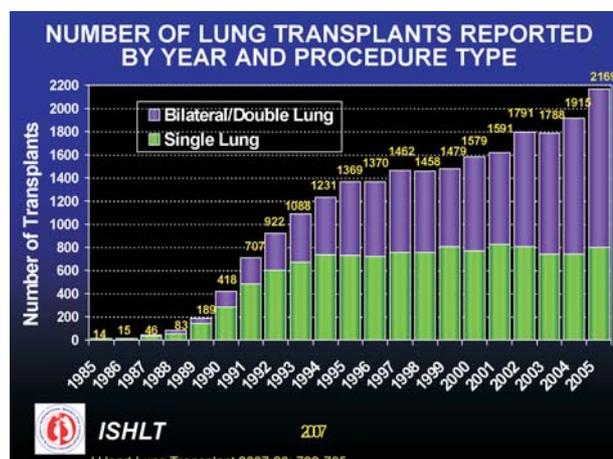


**Figure 1.** Annual number of heart transplants recorded in the registry of the International Society for Heart and Lung Transplantation. In 2005 there was a small increase over the previous year for the first time since 1994.

deaths on the waiting list have both been decreasing recently, at both the Greek and the international level.<sup>1-3</sup> This fall is probably due to an improvement in patient medical management,<sup>4</sup> accumulated experience,<sup>5</sup> and the improved results of mechanical circulatory support.

Mechanical circulatory support as a bridge to heart transplantation, which has been widely used since 2000, has led to the emergence of new therapeutic dilemmas. Increasingly often we face patients who have been given an implantable left ventricular assist device (LVAD) as a bridge to transplantation and who later refuse the transplant simply because they are satisfied with the quality of life the LVAD provides.<sup>6</sup> There are also quite a lot of patients who initially refuse transplantation, but then change their minds, reapply for inclusion on the list and ultimately undergo transplantation successfully. Perhaps the scenario of a patient receiving support from an LVAD for many years and then having a transplant is a reasonable one. Theoretically, we could prolong survival even more by adding to the 11-year survival after heart transplantation several extra years' survival on an LVAD. It should be noted that more than 7 years' survival has already been reported for a patient with an LVAD.<sup>7</sup>

Another dilemma could be the 35-year-old patient with acute decompensation of advanced chronic heart failure who is supported by inotropic medication and an intra-aortic balloon pump in the intensive care unit. Should we prefer transplantation with a graft from a borderline donor, or support with an implantable LVAD



**Figure 2.** The annual number of lung transplants recorded in the registry of the International Society for Heart and Lung Transplantation has shown a spectacular increase in recent years, as a result of the tripling of the bilateral lung transplants compared with a decade ago.

and transplantation at a later stage when an ideal donor heart is found? In the latter case, the mortality of the LVAD is added to that of the transplant, but survival with the “good” graft is expected to be better than with the “borderline” one. And if instead of support with an intra-aortic balloon pump the young patient is on an extracorporeal membrane oxygenator (ECMO), what is the best solution then? To resolve these dilemmas we need evidence from large databases, such as the ISHLT registry and INTERMACS, the registry of mechanical circulatory support in the USA.

## Survival

The most important risk factors for one-year mortality following heart transplantation appear to be temporary mechanical support and a history of congenital heart disease. These factors increase the relative risk by two to three and a half times in the ISHLT registry. In contrast, preoperative support with an implantable LVAD, such as the pulsatile Thoratec Heart Mate I or World Heart's Novacor, increases the relative risk by just 27%. Newer generation implantable continuous flow devices do not seem to differ from the above pulsatile models in terms of indications and outcomes as a bridge to transplantation.

In the last decade there seems to have been a significant reduction in one-year mortality, in contrast to mortality after the first year, which apparently has remained stable. The mean survival after heart transplantation is estimated today at 11 years, while survival among

recipients who live beyond the first year is 13 years. For lung transplantation the corresponding figures are 5 and 7 years, and for heart-lung transplantation 3.4 and 9 years.<sup>1-3</sup>

We should congratulate the transplant team of the Onassis Cardiac Surgery Centre on achieving such excellent survival rates with their heart transplant patients, comparable with the best international results. The report from the Onassis Centre confirms the international experience, which shows that a low annual volume of heart transplants at a given centre has ceased to be a risk factor for post-transplant mortality.

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