Long-term Survival after Staged Two Single versus Standard Sequential Double Lung Transplantation using UNOS Database

Objective: Through capitalizing on the short-term advantages of a single lung transplant and the long-term survival advantages of a double lung transplant (DLT), the approach of staged two single lung transplant (SSLT: essentially a bilateral LT) may be a worthwhile option in the current era with an outstanding increase in elderly patients with multiple comorbidities to be considered for LT.

Methods: Using the United Network for Organ Sharing (UNOS) dataset between 1987 and 2018, the outcomes of SSLT approach were retrospectively analyzed and rigorously compared to those with standard DLT. Recipient and donor variables, early outcomes were compared between the second stage SSLT and primary DLT. Survival after SSLT from the first stage transplant was compared to survival after DLT. Risk factors for 1-year mortality after the second stage transplant of SSLT approach were also assessed.

Results: 278 SSLT and 21121 primary DLT recipients were selected for this analysis. While the total number of redo LT was significantly increased after lung allocation score introduction in 2005, the number of the second stage SSLT also increased, but then gradually decreased over the years. The recipients were significantly older and had a higher baseline creatinine and a higher prevalence of DM in the SSLT than those in the DLT group. The median interval between the first and second stage transplant in SSLT was 960 days while 60 out of 278 patients (21.6%) underwent the second stage transplant within 1 year. The indications for their second stage transplant in SSLT included chronic lung allograft dysfunction (n=148, 53.2%), original disease (n=81, 29.1%), primary graft failure (n=23, 8.3%), acute rejection (n=5, 1.8%) and others (n=21, 7.6%). Most of the posttransplant short-term outcomes as well as the incidences of major complications were equivalent between the SSLT and DLT groups whereas the renal insufficiency requiring hemodialysis was notably higher in the SSLT group. Survival after SSLT from the date of the first stage transplant at 1, 5, 10 and 20 years was 94.2%, 65.0%, 37.1% and 13.2%, respectively, and the corresponding survival after DLT was 85.2%, 58.3%, 37.1% and 13.6%, respectively (Figure, P=0.283). In multivariate analysis, baseline creatinine (odds ratio 2.06; P=0.005) and ventilator at the time of the second stage transplant (odds ratio 4.88; P<0.001) were found to be independent predictors for 1-year mortality after SSLT.

Conclusions: Long-term outcomes after SSLT approach appear to be comparable to the conventional DLT during the study period over 20 years. With further analysis of the individual risk profiles including preoperative renal function and functional status which are suggested through this study, the SSLT approach can be a valuable option for the patients who would have undergone a single lung transplant and pursue the long-term benefits through the second transplant.

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