Heart Transplantation in Patients With Diabetes

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The superior survival rate and average improvement in functional capacity associated with heart transplantation have made it the optimal therapeutic option for selected patients with end-stage heart failure. The current average survival rate of 80% to 85% at 1 year after transplantation and 60% to 65% at 5 years after transplantation far exceeds that reported for any other type of medical or surgical treatment for this population of patients. However, the outcomes with this procedure are not uniform and are influenced significantly by the presence of comorbidities such as end-organ dysfunction, malnutrition, and overall functional status at the time of the procedure.

Diabetes mellitus (DM) is a disease that is increasing at alarming rates in the US population. The progression of vascular and other complications correlates in part with the length of time that the disease has been present, especially the duration of need for insulin therapy, but also with the level of glucose control. Poor glucose control and onset of disease under the age of 20 years are often associated with progressive target-organ dysfunction (particularly renal failure) and coronary, cerebral, and peripheral vascular disease, with MI, stroke, claudication/amputations, and blindness in advanced cases. DM has become the No. 1 cause of renal failure, dialysis, and kidney transplantation. It is also estimated that DM may be present in >40% of patients with heart failure, either as a primary contributor to coronary artery disease and atherosclerosis or a common secondary comorbidity.

The limited number of available cardiac donors (estimated to be only 40% of all kidney donors) necessitates utilization of the available donor hearts in those with the greatest chance for a good outcome. Given the frequent presence of comorbidities in patients who develop heart failure in the setting of long-term insulin therapy, most treatment centers have been reluctant to evaluate or offer transplantation to those with type 1 DM because of concerns of progressive complications over time that would reduce the quality of life and outcome in these patients. Recognizing that target-organ dysfunction is not uniformly correlated with time since DM diagnosis, national guidelines have suggested that DM, per se, should not a priori be excluded from consideration for the procedure but should warrant a thorough assessment of the impact of DM-related comorbidities on outcome. In this issue of Circulation, Russo and colleagues report the largest analysis to date of >20,000 heart transplant recipients to compare the impact of DM on outcome between patients with and without the disease. Importantly, the authors stratified the patients with DM by the presence and number of DM-related comorbidities and complications such as stroke, renal failure, peripheral vascular disease, and morbid obesity.

The data demonstrate that the survival rate after transplantation in patients with DM is significantly worse than in patients without DM, but those patients with DM who were free of significant complications had a survival rate nearly equal to and not significantly different from that of patients without DM. Importantly, this study by Russo et al also demonstrates that the complications were additive in their adverse effect on survival, with each additional complication worsening outcome such that patients with 2 or more complications had only a 3.6-year average duration of survival. Although patients with DM did not show an increase in posttransplantation complications such as coronary artery disease or rejection, the rate of infection was directly related to the number of DM-related complications before transplantation. Finally, the study also showed that posttransplantation functional capacity was worse in patients with DM and proportional to the number of pretransplantation complications of the disease.

The results of this study are important in that they clearly show that patients with DM are at greater risk of lower survival rate and less improvement in functional capacity after heart transplantation. Therefore, a patient with DM should not be a priori excluded from consideration for the procedure but should warrant a thorough assessment of the number and severity of DM-related complications. Patients with multiple comorbidities may have a better outcome with other therapies such as mechanical assist devices and represent a potentially unacceptable risk for heart transplantation.

Disclosures

Dr Miller has received honoraria from Grand Rounds and lectures at the University of California San Francisco, Ohio State University, and Heart Failure Society of America meetings, and has served as a consultant to Astellas Pharmaceutical.

References


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