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Commentary

Heart Transplantation for End-Stage Dilated Cardiomyopathy

Steve Morciano*

Department of Cardiology, University of Lille, Lille, France

DESCRIPTION

Dilated Cardiomyopathy (DCM) is a condition marked by the enlargement and weakening of the heart's main pumping chamber-the left ventricle-leading to impaired systolic function. Over time, this condition can progress to severe heart failure despite the use of optimal medical and device therapies. For patients who reach this advanced stage, known as end-stage heart failure, heart transplantation remains the most effective and definitive treatment option. It offers improved survival, enhanced quality of life, and relief from debilitating symptoms that cannot be controlled by conventional therapy.

DCM can result from a variety of causes, including genetic mutations, viral infections, autoimmune conditions, alcohol abuse, and exposure to certain toxins or medications. Regardless of the etiology, the final common pathway involves the progressive decline in cardiac function. As the disease worsens, patients may experience persistent symptoms such as dyspnea, fatigue, fluid retention, and arrhythmias. When these symptoms become refractory to standard treatments, and patients are frequently hospitalized or require continuous intravenous support, they are considered candidates for advanced therapies like heart transplantation.

Heart transplantation is typically reserved for patients with a poor prognosis who are unlikely to survive beyond one to two years without the procedure. Evaluation for transplant eligibility is a rigorous process involving multidisciplinary assessment. Clinicians assess cardiac function through imaging techniques such as echocardiography and cardiac MRI, along with hemodynamic measurements obtained *via* right heart catheterization. Functional capacity is measured using cardiopulmonary exercise testing, often focusing on peak oxygen consumption (VO2 max). A VO2 max below 14 mL/kg/min in patients on beta-blockers or below 10 mL/kg/min in patients not on beta-blockers is considered a strong indicator of the need for transplantation.

Beyond the medical evaluation, psychosocial factors play an important role. Patients must demonstrate psychological stability, adherence to treatment, and a supportive social network. Substance abuse, uncontrolled mental illness, or a lack of social support can disqualify a patient from transplant consideration. Immunological testing, including Human Leukocyte Antigen (HLA) typing and Panel Reactive Antibody (PRA) screening, is also conducted to reduce the risk of organ rejection.

While awaiting transplantation, many patients require mechanical circulatory support. Left Ventricular Assist Devices (LVADs) are frequently used as a bridge to transplant, providing hemodynamic stability, improving end-organ perfusion, and enhancing quality of life. These devices can sustain patients for months or even years while they await a suitable donor heart. In acute settings, other support options like intra-aortic balloon pumps or Extracorporeal Membrane Oxygenation (ECMO) may be used to stabilize critically ill patients.

The surgical procedure for heart transplantation involves the removal of the recipient's diseased heart and implantation of a donor heart, typically performed *via* an orthotopic approach. The procedure requires cardiopulmonary bypass and precise surgical technique to connect the donor heart to the remaining atrial tissue, aorta, and pulmonary artery. The operation usually takes several hours, followed by intensive care monitoring to manage immediate postoperative concerns such as bleeding, arrhythmias, and early signs of rejection.

Rejection is a significant concern in the months and years following transplantation. It can be acute or chronic and may present with non-specific symptoms such as fatigue, dyspnea, or fever. Surveillance strategies include regular endomyocardial biopsies, especially in the first year post-transplant, along with non-invasive tools like echocardiography and emerging techniques such as gene expression profiling. Chronic rejection, also known as cardiac allograft vasculopathy, is a leading cause of long-term graft failure and requires aggressive risk factor modification and ongoing surveillance.

Infection is another major risk due to the suppressed immune system. Patients are often given prophylactic antimicrobial medications to guard against common opportunistic pathogens, including Cytomegalovirus (CMV), fungal organisms, and Pneumocystis jirovecii. These preventive strategies are essential

Correspondence to: Steve Morciano, Department of Cardiology, University of Lille, Lille, France, E-mail: Steve.morc08@gmail.com

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in the early months post-transplant, when the risk of infection is highest.

Despite these challenges, heart transplantation offers excellent outcomes for patients with end-stage DCM. Survival rates are high, with over 85% of patients living one year post-transplant and around 75% surviving five years. Many patients experience a dramatic improvement in symptoms, functional status, and overall quality of life. Unlike patients with ischemic cardiomyopathy, those with DCM often fare better after transplant due to fewer comorbidities and generally younger age at the time of surgery.

CONCLUSION

In conclusion, heart transplantation is a life-saving therapy for patients with end-stage dilated cardiomyopathy who have exhausted all other treatment options. It offers the potential for extended survival, symptom relief, and a return to active life. While the procedure entails complex management and lifelong care, it remains the most definitive and effective solution for selected patients with advanced heart failure. Continued advancements in immunosuppression, organ preservation, and donor selection will further improve outcomes and accessibility for this transformative therapy.