Cardiac Transplantation

Considerations for the Intensive Care Unit Nurse

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KEYWORDS

• Heart transplantation • Advanced heart failure • Immunosuppressive therapy
• Rejection • Endomyocardial biopsy • Denervated heart

KEY POINTS

- Heart transplantation is indicated for patients with advanced heart failure who remain symptomatic despite receiving optimal medical and device therapies.
- A shortage of available organs has increased the need for life support with a bridge to transplant primarily in the form of left ventricular assist devices.
- Postoperative complications of heart transplantation include right heart failure, conduction abnormalities, and infection.
- Transplant rejection continues to be one of the major causes of death and is most frequent during the first month after heart transplant.
- Immunosuppressive maintenance therapy prevents rejection and most commonly consists of triple-drug therapy in the initial postoperative period.

INTRODUCTION

Considerable progress has been made within the field of heart transplantation following the first successful human heart transplant (HT) in 1967.[1] Since that time, more than 100,000 HTs have been performed worldwide.[1] Heart transplantation has become the preferred therapy for select patients with advanced heart failure (HF) who despite receiving optimal medical and device therapies continue to manifest symptoms. Cardiomyopathy is the primary condition leading to HT. Other etiologies contributing to advanced HF requiring HT are listed in **Box 1**.[2]

HT improves survival and quality of life for patients with advanced HF. A limiting factor to this curative treatment is donor availability. The number of HTs performed

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Box 1
Common underlying conditions requiring heart transplantation

- Cardiomyopathy
- Ischemic cardiomyopathy
- Valvular heart disease
- Repeat heart transplantation
- Congenital heart disease

within the United States has plateaued to approximately 2400 annually, with most transplant centers performing 10 to 19 HTs annually.[2] There has been a decrease in death rates for those waiting for HT following an increase in the number of left ventricular assist devices (LVAD) being performed. Patients with an LVAD are at an increased risk for transplantation. **Box 2** highlights potential complications that may increase the risk of an unsuccessful HT.

Approximately 85% to 90% of HT patients live longer than 1 year following their surgery; with the 3-year survival rate being almost 75%.[2] Critical organ shortages require health care providers to perform a rigorous panel of testing and evaluation on patients before deeming them a HT candidate. Major contraindications for HT are related to medical and psychosocial issues. **Box 3** lists contraindications for HT.

PREOPERATIVE PREPARATION

Once a donor is identified for the recipient, a virtual crossmatch is performed to decrease the chance of rejection. The United Network of Organ Sharing (UNOS) is the national regulatory and organ allocation system where transplant centers list patients waiting for HT. UNOS will list donors' antigens and each center will have a list of the recipient's antibodies. Careful attention is paid to compare the two to see if there will be any interaction. Before arriving in the operating room (OR), the HT candidate is examined and laboratory results are evaluated. If there are any issues suggesting signs of infection or significantly abnormal laboratory values, the surgery will be aborted and the next patient on the list will be evaluated for compatibility of the donated organ. Recipients who are on warfarin preoperatively will have anticoagulation reversal with fresh frozen plasma or vitamin K before arriving in the OR. The risk of bleeding and causing hemodynamic compromise in the patient with a re-do sternotomy has led many centers to implement the use of prothrombin complex concentrate (Kcentra) in conjunction with vitamin K, if there is limited time preoperatively to adequately reverse the anticoagulation. They are typed and screened for

Box 2
Left ventricular assist device complications increasing the risk of heart transplantation

- Infection
- Higher antibody levels
- Atriovenous malformations
- Stroke
- Re-do sternotomy