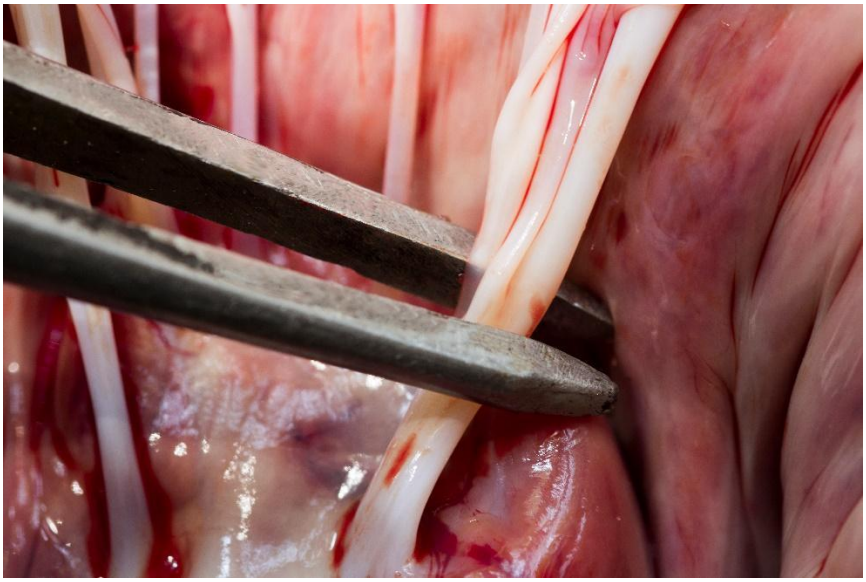
# Heart Transplant

## In Brief



**by Justin Cole, M.D. and David Spielvogel, M.D.**

Heart transplant is a procedure indicated for severe, irreversible cardiac disease, often in relatively young patients. It consists of replacement of the de novo heart with a compatible donor allograft.

### Indications

Indications for heart transplant include end-stage heart failure with objective, impaired functional capacity despite optimal medical management; recurrent, life-threatening arrhythmias refractory to medical therapy; intractable angina refractory to medical therapy and other interventions; primary cardiac tumors; and hypertrophic or restrictive cardiomyopathy not amenable to standard surgical intervention (i.e. myomectomy).

### Contraindications

Contraindications for heart transplant include: severe, irreversible pulmonary hypertension; severe peripheral vascular disease; late-stage diabetes mellitus with organ failure/irreversible organ damage; severe, irreversible liver, kidney, or pulmonary disease (but may be amenable to multiorgan transplant [i.e. heart-kidney transplant]);

active tobacco or illicit drug use; active infections; body mass index < 15 or > 40, or age > 70 years (relative contraindications).

## Treatment and Recommended Follow-Up

Before heart transplant, all patients must receive pneumococcal and influenza vaccinations (and hepatitis B vaccine, if not immune). Immediately following transplant, all patients must receive triple therapy consisting of glucocorticoids, calcineurin inhibitors, and antiproliferative agents. Patients are progressively weaned off glucocorticoids over 3-6 months. Prophylaxis should be immediately provided for *Pneuomocystic carinii* (with trimethoprim/sulfamethoxazole), herpes simplex virus (with acyclovir, valacyclovir), and oral candidiasis. Valganciclovir should be used in cytomegalovirus (CMV) -seropositive individuals. Acute graft rejection (humoral type) should be treated with high-dose intravenous (IV) corticosteroids with plasmapheresis and low-dose IV immunoglobulin. Acute graft rejection (cell-mediated type) should be treated with high-dose IV corticosteroids. Anti-thymocyte antibodies should be added if there is hemodynamic compromise and/or no improvement within the first days of steroid therapy.

Cardiac allograft vasculopathy (CAV) is a common cause of chronic graft rejection. Treatment/prophylaxis includes statins, angiotensin-converting enzyme inhibitors, and calcium-channel blockers. Ganciclovir prophylaxis also helps prevent CAV progression secondary to CMV viral infection. Outcomes for advanced CAV are poor, and retransplantation is the only definitive treatment.

## Prognosis

Median survival after heart transplant is ~13 years.

## Complications

Graft Rejection: Hyperacute graft rejection occurs within minutes to hours of heart transplant and is rare with current human leukocyte antigen and blood-typing techniques. Acute rejection may occur within weeks to years and is diagnosed by myocardial biopsy (usually performed on a regular basis). It may be caused by poor compliance with immunosuppressive agents. Chronic rejection occurs months to years after transplantation and leads to irreversible damage to the allograft, occurring in 8% in the first year and 32% after 5 years.

Coronary angiography and/or Dobutamine stress echocardiography is often used to screen patients for allograft vasculopathy.

Isolated right ventricular failure is more common than biventricular failure in heart transplant patients due to pulmonary hypertension. Most patients have a reversible component that resolves shortly after transplant. A fixed component may persist.

Tricuspid regurgitation occurs in 19%-84% of all transplant patients. Patients can typically be managed conservatively with diuretics. Some degree of mitral regurgitation occurs in ~ 50% of all patients in the postoperative period and is typically asymptomatic.

Hypotension occurs in some patients postoperatively secondary to systemic vasodilation. All of these patients should be worked up for possible sepsis. These patients may respond to alpha agonists.

Sepsis is a major cause of early morbidity and mortality in the transplant patient, accounting for roughly 20% of deaths within the first year of surgery.

## ABOUT THE AUTHORS

### David Spielvogel, M.D.

Dr. Spielvogel, professor of Cardiothoracic Surgery at New York Medical College, is a Diplomate of the National Board of Medical Examiners, the American Board of Surgery and the American Board of Thoracic Surgery. He is Chief of Cardiothoracic Surgery and Director of Heart Transplantation at Westchester Medical Center in Valhalla, New York. He is well-known among colleagues as an innovator and pioneer of many heart surgery techniques—including aortic arch replacement—widely used in hospitals around the world. Dr. Spielvogel has performed over 350 heart transplants, has implanted an assortment of mechanical assist devices, and completed open surgeries to treat the spectrum of diseases and complications of the heart. Dr. Spielvogel enjoys hiking and sailing with his family and friends.

### Justin Cole, M.D.

Dr. Cole graduated from New York Medical College and is currently a second year surgical resident in otolaryngology at the School of Medicine and Dentistry at the University of Rochester. A native of Cleveland, Dr. Cole completed his undergraduate education at Ohio University. His hobbies include philosophy, camping, hiking and astronomy.

## References

Birati, EY, Rame JE. Post-heart transplant complication. *Crit Care Clin*. 2014;30:629-637.