JACC: HEART FAILURE VOL. 5, NO. 12, 2017

ISSN 2213-1779/$36.00
PUBLISHED BY ELSEVIER
https://doi.org/10.1016/j.jchf.2017.08.021

50TH ANNIVERSARY OF CARDIAC TRANSPLANTATION SPECIAL ISSUE

STATE-OF-THE-ART REVIEWS

Cardiac Transplantation

Current Outcomes and Contemporary Controversies

Michelle M. Kittleson, MD, PhD, Jon A. Kobashigawa, MD

JACC: HEART FAILURE CME/MOC

This article has been selected as the month's *JACC: Heart Failure* CME/MOC activity, available online at http://www.acc.org/jacc-journals-cme by selecting the *JACC* Journals CME/MOC tab.

Accreditation and Designation Statement

The American College of Cardiology Foundation (ACCF) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

The ACCF designates this Journal-based CME/MOC activity for a maximum of 1 *AMA PRA Category 1 Credit(s)*. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Method of Participation and Receipt of CME/MOC Certificate

To obtain credit for *JACC: Heart Failure* CME/MOC, you must:

1. Be an ACC member or *JACC* subscriber.
2. Carefully read the CME/MOC-designated article available online and in this issue of the journal.
3. Answer the post-test questions. At least 2 out of the 3 questions provided must be answered correctly to obtain CME/MOC credit.
4. Complete a brief evaluation.
5. Claim your CME/MOC credit and receive your certificate electronically by following the instructions given at the conclusion of the activity.

CME/MOC Objective for This Article: Upon completion of this activity, the learner should be able to: 1) discuss the key differences between the current and proposed heart allocation; 2) discuss the potential interventions to increase equitable access to heart transplants; and 3) identify the current and potential ways to diagnose and treat rejection after heart transplant.

CME/MOC Editor Disclosure: Editor-in-Chief Christopher M. O'Connor, MD, has received consultant fees/honoraria from AbbVie, Inc., Actelion Pharmaceuticals Ltd., Bayer, Bristol-Myers Squibb, Cardiorentis, Merco & Co., Inc., ResMed, and Roche Diagnostics; and ownership interest in Biscardia, LLC. Executive Editor Mona Fiuzat, PharmD, has received research support from ResMed, Gilead, Critical Diagnostics, Otsuka, and Roche Diagnostics. Tariq Ahmad, MD, MPH, has received a travel scholarship from Thoratec. Abhinav Sharma, MD, has received support from Bayer-Canadian Cardiovascular Society, Alberta Innovates Health Solution, Roche Diagnostics, and Takeda. Mitchell Psotka, MD, PhD, and Kishan Parikh, MD, have no relationships relevant to the contents of this paper to disclose.

Author Disclosures: Dr. Kobashigawa has received research support from Novartis, CareDx, and TransMedics. Dr. Kittleson has reported she has no relationships relevant to the contents of this paper to disclose.

Medium of Participation: Print (article only); online (article and quiz).

CME/MOC Term of Approval

Issue date: December 2017
Expiration date: November 30, 2018

From the Cedars-Sinai Heart Institute, Los Angeles, California. Dr. Kobashigawa has received research support from Novartis, CareDx, and TransMedics. Dr. Kittleson has reported she has no relationships relevant to the contents of this paper to disclose.

Manuscript received June 27, 2017; revised manuscript received August 18, 2017, accepted August 29, 2017.

JACC: HEART FAILURE VOL. 5, NO. 12, 2017
DECEMBER 2017:857–68

Cardiac Transplantation

Current Outcomes and Contemporary Controversies

Michelle M. Kittleson, MD, PhD, Jon A. Kobashigawa, MD

ABSTRACT

Despite advances in pharmacologic and device treatment of chronic heart failure, long-term morbidity and mortality remain high, and many patients progress to end-stage heart failure. Over the last 5 decades, heart transplantation (HTx) has become the preferred therapy for select patients with end-stage heart disease. However, although HTx has become standard of care for the management of end-stage heart failure, challenges continue to exist. The number of patients with end-stage heart failure is increasing, whereas the number of donor organs remains constant and a limiting factor in HTx. Not only are there more potential heart transplantation candidates, but HTx candidates today are more complex: older, sensitized, and in need of mechanical circulatory support. Such candidates are at higher risk for poor outcomes including primary graft dysfunction and antibody-mediated rejection. This article focuses on current post-transplantation outcomes and recent advances in HTx that could address the current challenges. These advances include: 1) attempts to expand the donor pool; 2) proposed changes in HTx allocation policy for more equitable organ distribution; 3) a better understanding of the definition and management of primary graft dysfunction; and 4) advances in the management of sensitized HTx candidates. Developments in these areas could result in expansion and more equitable distribution of the donor pool and improved survival and quality of life for HTx recipients. (J Am Coll Cardiol HF 2017;5:857–68) © 2017 by the American College of Cardiology Foundation.

Despite advances in pharmacologic and device treatment of heart failure (HF), long-term morbidity and mortality remain high, and many patients progress to end-stage HF. Over the last 5 decades, heart transplantation (HTx) has become the preferred therapy for select patients, with a 1-year survival of almost 90% and a conditional half-life of 13 years (1), certainly far better than expected from end-stage HF.

However, challenges still exist. The number of patients with end-stage HF is increasing, whereas the number of donor organs remains a constant and limiting factor (2). Not only are there more potential HTx recipients, but they are also more complex. There are now more candidates 65 years of age and older (3), with mechanical circulatory support (3), and with antibodies to human leukocyte antigens (HLA), so-called sensitization (4).

These HTx candidates of the modern era who are older, require mechanical circulatory support, and who are sensitized are at higher risk for poor outcomes including primary graft dysfunction and antibody-mediated rejection (1,2,5). This review focuses on the current status of HTx and recent advances that could address the current challenges (**Central Illustration**), which include: 1) attempts to expand the donor pool; 2) changes in the allocation policy for more equitable organ distribution; 3) a better understanding of primary graft dysfunction; and 4) management of sensitized HTx candidates. These developments could result in expansion and more equitable distribution of donor hearts and improved survival and quality of life for HTx recipients.

POST-TRANSPLANTATION OUTCOMES

Survival after HTx has steadily improved in the past 5 decades. In the 1980s, 1-year survival was 70%, and the conditional half-life, the time at which 50% of patients who survived the first year are still alive, was 9.4 years. In the 2016 report from the International Society of Heart and Lung Transplantation registry, 1-year survival is almost 90%, with a conditional half-life of 13.2 years (1). Notably, the mortality rate beyond 1 year after transplantation has improved only marginally for patients who received allografts after 1992. There has been no significant improvement in the past 2 decades, likely because the processes responsible for long-term mortality, including cardiac allograft vasculopathy and malignancy, remain a challenge of detection and treatment.