

Task Force 8: Training in Heart Failure and Transplantation

SHARON A. HUNT, MD, FACC, CHAIRMAN, MICHAEL R. BRISTOW, MD, FACC,
SPENCER H. KUBO, MD, FACC, JOHN B. O'CONNELL, MD, FACC, JAMES B. YOUNG, MD, FACC

The treatment of heart failure has long been considered the "bread and butter" of clinical cardiology and the subject of transplantation one of the more esoteric offshoots of the field. However, in the 1990s, advances in both fields have led to increasingly specialized and sophisticated therapy for heart failure at the same time that the application of transplantation for end-stage heart disease has become widely accepted and practiced. Thus, it now seems appropriate to include specific training in both areas in programs that train consultants in cardiovascular medicine and to describe advanced training for those who wish to devote a substantial part of their career to this field.

Training in Heart Failure

General Training—Level 1

The fundamental concepts involved in the physiology of congestive heart failure and its treatment should be well understood by all trainees in cardiovascular medicine as part of the core curriculum. Training in clinical management of heart failure should include supervised experience in both inpatient and outpatient settings and involve a spectrum of underlying etiologies for the heart failure. Trainees should be well acquainted with the nuances of therapy of heart failure particular to different underlying etiologies and be conversant with the pharmacology of the standard cardiovascular drugs used to treat heart failure. Ideally, there will be a dedicated heart failure/transplant clinical service, and rotation on this service will be incorporated during the trainee's clinical nonlaboratory experience. Because not all centers have such services, the involvement of faculty with expertise in this area should be required as part of the clinical training program.

Specialized Training—Level 2

Trainees who wish to have more advanced training in heart failure should be enrolled in programs that include specific clinics and usually inpatient services for patients requiring therapy for advanced heart failure. Such programs will usually be found in institutions pursuing active programs in cardiac transplantation as one of the spectrum of modalities for heart failure therapy. Such programs will also usually include research efforts focused on the use of new or experimental treatment modalities—both drugs and devices—as well as transplantation. Trainees should be well versed in interpreta-

tion of hemodynamic data with both acute and chronic interventions and in assessment of prognosis, as well as in the nature and status of major and ongoing advances in the field.

Advanced Training—Level 3

For trainees who wish to pursue a career in heart failure, an extended program is encouraged. In addition to the recommended program for specialized training outlined earlier, this program should include concurrent active participation in laboratory and clinical research and individual responsibility for research efforts. The trainee should participate in such activities for a 12-month period beyond basic cardiovascular training.

Training in Cardiac Transplantation

General Standards and Environment

It is recognized that not all centers with training programs in cardiovascular medicine also have active programs in cardiac or cardiopulmonary transplantation. Thus, it will not be possible (and probably not desirable) for all cardiovascular trainees to have hands-on experience with the management of cardiac transplant recipients. With the large number of heart transplants performed annually (currently ~2,500) and the excellent survival rates (80% to 90% at 1 year), a rapidly increasing number of long-term transplant recipients requiring sophisticated care is accruing, and cardiovascular specialists can expect to be called on to participate in their care. It is important, therefore, that training in any program include both didactic and practical experience with the role of transplantation in the management of various types of end-stage heart disease and with the thoughtful selection of (and referral of) such patients for transplantation procedures. Trainees should also have a basic understanding of a number of transplant-related issues, including: 1) overall success rates and survival rates to be expected; 2) the atypical physiology of the denervated heart; and 3) the major types of long-term complications to be anticipated, especially allograft coronary artery disease and complications due to immunosuppression.

Advanced Training

For trainees who wish to devote a substantial portion of their career to transplant-related research and patient man-

agement, further training beyond other clinical requirements for cardiology training should be required. Although there are currently very few formal training programs in transplant cardiology, a number of centers do provide such training, and an outline of the important aspects can be drawn. Formal criteria for certification of a cardiac transplant physician from the bylaws of the United Network for Organ Sharing (UNOS), the U.S. organ procurement and transplantation network, are included in the Appendix.

Training resources and faculty. Training should be obtained at a center that has an established program in clinical cardiac transplantation and a reasonable volume of transplant procedures, preferably >20 procedures/year. The training program should be staffed by one or more board-certified cardiologists with recognized training and expertise in and commitment to cardiac transplantation. The program will of necessity also be staffed by one or more board-certified cardiovascular surgeons and usually encompasses a training program in transplant surgery as well. Centers with such programs will also require the availability of highly qualified consultants in infectious disease, nephrology and pulmonary medicine and will have periodic meetings and conferences devoted to cardiac transplantation. This period of advanced training will usually be simultaneous with advanced training in heart failure as outlined above and may occur during the trainee's period of regular cardiology training; such training would satisfy minimum UNOS criteria. However, most programs offering such advanced training should require participation for a 12-month period beyond basic cardiovascular training.

Training experience. The advanced trainee in cardiac transplantation should spend 1 year involved in all phases of pretransplant and posttransplant clinical management and will usually participate in laboratory or clinical transplant-related research as well. He or she should have hands-on experience with the care of acute and chronic heart failure, recipient selection, postoperative immunosuppressive management, histologic interpretation of myocardial biopsies for rejection and long-term outpatient follow-up. The trainee should have acquired a working knowledge of donor selection, the use of mechanical assist devices, methods of organ procurement and preservation and transplant surgical procedures and perioperative management. He or she should be competent in the performance of right ventricular endomyocardial biopsies in addition to the more standard invasive procedures learned earlier in training. Such training will qualify the cardiologist under current UNOS guidelines as a cardiac transplant physician.

Evaluation of Trainees

Evaluation by the program director and faculty should be an integral part of the educational process, and procedures for regular evaluation of clinical competence and research progress should be established in each program. There should also be provisions for regular feedback on this evaluation to the trainee and for keeping of records of these evaluations. There are currently no types of formal examination or certification for the added qualification in heart failure and trans-

plantation. It is the responsibility of the program director to confirm and document the individual's competency and thoroughness of training. The director should be prepared to certify specifics of the training experiences to UNOS (and other organizations in the future) that require them for program certification.

Appendix

*Criteria for Cardiac Transplant Physicians**

(1)(b) Transplant Physician

Thoracic Organs. Each transplant center must have on site a qualified transplant physician. The cardiac transplant physician will be board certified or have achieved eligibility in adult or pediatric cardiology or the subspecialty of his or her major area of interest by the American Board of Internal Medicine or the American Board of Pediatrics. To qualify as a cardiac transplant physician, the training/experience requirements will be met if the following conditions of either (aa), (bb), (cc) or (dd) are met:

(aa) Training/experience during the applicant's cardiology fellowship.

(i) That the individual will have been involved in 20 or more cardiac transplantations under the direct supervision of a qualified cardiac transplant physician and in conjunction with a cardiac transplant surgeon at a UNOS-approved cardiac transplant center that conducts 20 or more heart transplants each year.

(ii) That the individual has been involved with and has acquired a working knowledge of cardiac transplantation, including the care of acute and chronic heart failure, donor selection, use of mechanical assist devices, recipient selection, pre- and postoperative hemodynamic care, postoperative immunosuppressive therapy, histologic interpretation and grading of myocardial biopsies for rejection, and long-term outpatient follow-up. In addition, the individual should participate as an observer in 5 organ procurements and subsequent transplants.

(iii) That the above training be in addition to other clinical requirements for cardiology training.

(iv) That the individual has a letter sent directly to UNOS from the director of the individual fellowship training program as well as the supervising qualified cardiac transplant physician verifying the fellow has met the above requirements and that he or she has qualified to become a medical director of a cardiac transplant program.

(v) That the above training be performed at a hospital with an American Board of Internal Medicine certified fellowship training program in adult cardiology and/or an American Board of Pediatrics certified fellowship training program in pediatric cardiology.

(bb) When the training/experience requirements for the cardiac transplant physician have not been met during a cardiology fellowship, they can be met during a separate

*From: UNOS By-Laws, Appendix B, Section IIIC. *Unos Update*, 1991;7(3): 11-3.

- 12-month transplant medicine fellowship if all of the following conditions are met, and the individual is a board certified or eligible cardiologist.
- (i) Same as (i) above.
 - (ii) Same as (ii) above.
 - (iii) That the individual has a letter sent directly to UNOS from the director of the individual fellowship training program as well as the supervising qualified cardiac transplant physician verifying that the fellow has met the above requirements and that he or she has qualified to become a medical director of a cardiac transplant program.
 - (iv) Same as (v) above.
- (cc) If the cardiologist has not met the above requirements in a cardiology fellowship or specific cardiac transplant fellowship, the requirements can be met by acquired clinical experience if the following conditions are met, and the individual is a board certified cardiologist.
- (i) Same as (i) above.
 - (ii) Same as (ii) above.
 - (iii) That the cardiologist should write a detailed letter to UNOS outlining his or her experience in a cardiac transplant program. In addition, there should be two supporting letters one of which is from the heart transplant surgeon at the cardiologist's institution who has been directly involved with the individual and can certify his or her competence.
- (dd) If the physician is not a cardiologist, he/she can qualify as the cardiac transplant physician to operate in conjunction with the continuing involvement of a board certified or eligible cardiologist if the following conditions are met.
- (i) Same as (i) above.
 - (ii) Same as (ii) above.
 - (iii) That a board certified cardiologist or a cardiologist who has achieved board eligibility is an active participant in pre- and post-transplant recipient management in the cardiac transplant program where this non-cardiology board certified or eligible individual functions as a cardiac transplant physician.
 - (iv) That the physician should write a detailed letter to UNOS outlining his/her experience at the UNOS approved cardiac transplant program. In addition, there should be two supporting letters, one of which is from the heart transplant surgeon at that institution who has been directly involved with that individual and can certify his/her competence.

Task Force 9: Training in the Care of Adult Patients With Congenital Heart Disease

DAVID J. SKORTON, MD, FACC, CHAIRMAN, MELVIN D. CHEITLIN, MD, FACC,
MICHAEL D. FREED, MD, FACC, ARTHUR GARSON, JR., MD, MPH, FACC,
WILLIAM W. PINSKY, MD, FACC, DAVID J. SAHN, MD, FACC, CAROLE A. WARNES, MD, MRCP

The care of the patient with congenital heart disease has long been the province of pediatric cardiologists and cardiovascular surgeons. With advances in surgical and medical management, increasing numbers of patients with congenital heart disease are surviving into adulthood. These patients often present complex combinations of problems that may be unfamiliar to those who undergo a traditional medical (internal medicine) cardiology training program. Medical cardiologists are expert in the care of patients with acquired diseases of the heart and circulation, but currently most have little training in congenital heart disease, particularly in complex disorders. This report suggests an initial approach to the more systematic training of medical cardiologists in the recognition and care of adults with congenital heart disease.

We differentiate two levels of training and expected expertise in the care of adult patients with congenital heart disease:

Level 1 training represents the level of knowledge appropriate for *all* trainees in medical cardiology and indicates the knowledge content that each graduate of such a program should acquire. This level of knowledge should be tested in the Subspecialty Certification Examination in Cardiovascular Diseases and will provide the graduate with sufficient expertise to recognize and evaluate common congenital heart disorders in adults. However, for trainees with level 1 expertise, consultation with a pediatric cardiologist or level 2-trained clinician will be advisable when major management decisions are made about patients.

Level 2 training represents the level of knowledge needed by those graduates who wish to make a commitment to this field