

VIEWPOINT

VOICES IN CARDIOLOGY

The Dawn of the Invasive Heart Failure Specialist



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I am an early career cardiologist specializing in heart failure (HF). When I was applying for an advanced fellowship, I was interested in a training program that would allow me to perform more procedures. At the time, I was fascinated by the idea of being an “interventional HF specialist” and even thought about 2 years of training to achieve this goal: 1 year focusing on interventional cardiology and another focusing on HF. However, because of my visa limitations, I had to limit my training to only 1 year.

To avoid completely letting go of my academic pursuit, I dedicated a significant amount of time to performing procedures during my general and advanced fellowship. There were barriers, especially because these advanced procedures are not part of the Accreditation Council for Graduate Medical Education (ACGME) requirements for training in advanced HF and transplantation cardiology (AHFTC). This made it harder to justify being involved in procedures that were not a standard component of those requirements. However, I remained persistent. I wrote this piece at the time to state the need for such a hybrid training program but decided not to submit it for possible publication. More recently, I saw a social media post regarding someone wanting to pursue an interventional HF training program, and I was surprised at how little direction we could provide to individuals who want to pursue this field.

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BACKGROUND

The growing number of patients with HF is being met with a rapidly expanding repertoire of invasive diagnostic tests and therapeutic management options. Today, there are both temporary and permanent mechanical circulatory support devices (MCSs) (1). Implantable defibrillator technology (ICD) and cardiac resynchronization (CRT) are proven technologies that improve both the quality of life and length of life for many patients with HF. At the same time, invasive diagnostic technologies like intravascular ultrasonography are now used in the treatment of patients with transplants. Pressure monitoring systems placed invasively give physicians advance warning so they can change therapeutic regimens and keep patients living their life and out of the hospital. Currently, these interventions are performed by a scattered collection of subspecialists with regional variability. It is now time to create an invasive HF training pathway as an extension to the current approved subspecialty training pathway, to bring together this core collection of important procedures for HF patients.

IS THERE A NEED?

New devices are changing the landscape of currently practicing cardiologists. An increasing number of HF specialists and interventional cardiologists are now spending time in the catheterization laboratories with advanced HF patients. Although not formerly acknowledged, a new hybrid subspecialty is evolving. The dawn of the “interventional heart failure” or “invasive heart failure” specialist is here.

This idea is timely but not new. With the evolution of more devices for the treatment of HF, there is now a greater need for cardiologists who specialize in these invasive therapies. The few who endorse the

field are mostly interventional cardiologists with a focused practice in MCSD.

An important question is whether there is a true need for HF specialists who have advanced procedural skills. The answer is certainly yes. Additional procedural training is a natural extension of the skills and interests of HF specialists. Nowhere is the need for this training more evident than in patients with acute cardiogenic shock who require temporary MCSDs. The survival of these patients requires a thoughtful understanding of invasive hemodynamics, a mastery of HF pathophysiology, and the ability to place and troubleshoot temporary support devices. Most importantly, temporary support devices once placed cannot be forgotten. These devices require frequent monitoring, adjustment of device position, adjustment of settings to match the patient's condition, and, not infrequently, emergent replacement because of thrombosis or malfunction. This acute management is arguably best done by the same specialist who is providing daily (even hourly) management, who also has an appreciation of the long-term strategy (i.e., long-term left ventricular device placement or cardiac transplantation). With the expansion of temporary devices to include percutaneous right ventricular assist devices, the complexity is now at a point where a dedicated specialist is needed.

PROCEDURES

One of the most challenging aspects of proposing a specialty training program in invasive HF is defining the scope of practice. The hope is to find the ideal balance that affords the ability to develop and maintain procedural competence while at the same time providing the core procedures most needed by HF patients. Currently, invasive procedures for HF patients are performed by HF specialists and interventional cardiologists. If procedures that are rarely used for patients with HF or procedures that require significant dedicated expertise are excluded, then there is a natural overlap between the two specialties. **Table 1** indicates a list of procedures that may constitute the scope for this specialty.

DURATION OF TRAINING

Components of the technical expertise required for invasive HF training are as follows:

1. Chronic medically refractory HF: placement of remote monitoring devices.
2. Cardiogenic shock: acquiring skill sets in placement and troubleshooting of temporary devices such as balloon pump and Impella

and even extracorporeal membrane oxygenation is key.

3. Hemodynamics to diagnose cardiomyopathies and perform cardiac biopsies.

The above is perhaps only a partial list of advanced therapies in which HF specialists should be skilled. Most AHFTC programs, however, are geared toward proficiency in right heart catheterizations, biopsies, and clinical management of left ventricular assist devices, as is required by the ACGME. However, we are seeing more and more heterogeneity in procedural training, with variability in the skill set of the HF cardiologists in each program.

In my search for AHFTC programs, I found only a handful of programs in which fellows are trained in more invasive procedures. In my discussion with my mentor, he mentioned that most programs would not let fellows touch the artery. This is probably true of most programs.

The next question is the appropriate duration of training if such a program were to be developed. With all the different techniques mentioned above, it can be argued that a 1-year training program may not do justice to all facets of advanced HF and transplantation. A handful of HF cardiologists in the United States have taken the longer route of doing an extra year of interventional training to enrich their procedural skills. The issues with that, however, are that most people do not have the capacity to do an extra year for personal or financial reasons.

One option could be to divide the program into two branches: noninvasive (predominantly transplantation) HF and interventional HF. The argument for that, first and foremost, is that the burden of patients with devices will soon outweigh that of patients with transplants, given the scarcity of donor

ABBREVIATIONS AND ACRONYMS

- ACGME** = Accreditation Council for Graduate Medical Education
- AHFTC** = advanced heart failure and transplantation cardiology
- CRT** = cardiac synchronization therapy
- HF** = heart failure
- ICD** = implantable cardioverter defibrillator
- MCSD** = mechanical circulatory support device

TABLE 1 Core Suggested Procedures for Training in Invasive Heart Failure

Procedure	Reason Appropriate for an Invasive Heart Failure Specialist
Diagnostic coronary angiography	Screening for cause of cardiomyopathy
Right and left heart catheterization	Expert knowledge of heart failure and pulmonary hypertension pathophysiology allows the test to be tailored to specific information needed for management
Intravascular ultrasonography	Screening for cardiac allograft vasculopathy in cardiac transplant recipients; specialist can match findings to long-term management plan during the procedure
Percutaneous mechanical circulatory support devices	Specialist needed because device complexity requires expertise with multiple brands and models to choose best device for the individual patient
Endomyocardial biopsy	Evaluation for rejection in cardiac transplant recipients
Pulmonary artery pressure sensors	Evaluate and monitor pulmonary artery pressures to adjust medication regimen

organs (2). There are several centers that deal with percutaneous devices and left ventricular assist devices without entertaining transplantation as an option. Second, both fields are academically vast. Focusing on one area at a time would lay a steady platform for innovation and research instead of an academic “mush.”

An argument against procedural training is that it may reduce the amount of time fellows spend in learning crucial skills of diagnosing and managing complex cardiomyopathies and acquiring humanistic skills. The argument in favor, however, of being able to perform the procedure would enable the physician to have continuous involvement in patient care, rather than have a proceduralist with whom the patient has not developed a bond.

I remember these words of my mentor: “mechanical circulatory support and heart transplantation are inseparable. Training in both is extremely important.” Not receiving proper training in transplantation may result in inappropriate device implantation and patient selection.

CONCLUSIONS

With the evolution of treatment options available for HF, there is a need for invasive HF cardiologists. The current curriculum of training programs needs to evolve concurrently to address the complexity of HF management. It is of the essence now that trainees who would like to become invasive HF cardiologists should have a well-delineated pathway to acquire the procedural skills pertinent to their patient population.

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