

Of Becoming a Structural Heart Disease Expert: Another Giant Leap?

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Abstract

Over the last 10 years, Structural Heart Disease (SHD) has emerged as a distinct sub-specialty of interventional cardiology. However, to date there are no formal training guidelines or training programs. We believe as the population ages, over the next few years, this sub specialty will continue to mature and guidelines for training will become established.

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Key Words

Structural heart disease • Coronary angioplasty • Training in SHD

In July of 1969, how many children watched Neil Armstrong and Buzz Aldrin land the Apollo 11 on the surface of the moon, and take the first steps on its surface? Many of us remember Armstrong and more or less Aldrin; however, does anyone remember who kept the spaceship in orbit? Well, the pilot's name was Michael Collins and he was an Italian born American [1].

At that time, everyone was dreaming of becoming an astronaut. These were supermen: tough, smart, brave and dedicated professionals who operated the most complex, most advanced technology and equipment to fly to space and land on the moon. They had the satisfaction and the glory of being pioneers and discoverers. They were our heroes. They had earned the admiration of everyone, doing what nobody could have done before them. Their "one small step for man"...became a "one giant leap for mankind"...

Does this remind you of what is happening today

with Structural Heart Disease (SHD)? Cardiologists are very curious individuals, and I guess, this quality is inherent in our profession. When Andreas Grüentzig first opened the door to what is now called interventional cardiology by performing and describing percutaneous coronary angioplasty (PTCA), a large number of cardiology trainees wanted to become "interventionalists" [2]. Over the past 30 years, this sub-specialty has matured, and there are now concise training requirements [3]. Nonetheless within the nearly last 10 years, the evolution of coronary interventions has reached a plateau. Conversely, the so-called Structural Heart Disease (SHD) interventions have emerged as the new kid on the block.

The name SHD is now reserved to those acquired or congenital cardiovascular pathologies that involve the major central cardiovascular structures outside the scope of acquired atherosclerotic coronary and peripheral vessels pathologies [4-5]. The origins of the SHD interventions initially arose within the pediatric cardiology arena. It started by creating atrial septal defects in newborns with transposition of the great arteries [6], followed by balloon valvuloplasty [7] of the pulmonic valves. It was later extended to the adult population with percutaneous balloon aortic as well as mitral valvuloplasties. From the late 1980's to the early 2000's, a handful of interventional pediatric cardiologists and few adult coronary interventionists performed these SHD interventions. With the advent of transcatheter valve replacement, the field has been revolutionized in a very dramatic way, generating interest by both coronary interventionalists and



cardiac surgeons alike.

Structural heart disease deals with a large anatomical variation of many different cardiovascular structures, with various shapes and locations and a multitude of possibilities on how to access. This demands a core-knowledge different than traditional interventional training, one that is not solely based on angiography but requires the complete physiologic and 3D anatomic understanding of cardiovascular structures. The crux of the question remains: what is really needed to become a SHD Interventionist? Presently, there is no board certification in SHD, and no other formal or official guidelines for training. The majority of current specialists are trained by industry and “physician proctors” on the specific use of each individual device and are familiar with the various aspects of catheter-based therapies. This includes interventional cardiologists, interventional radiologists, pediatric cardiologists, cardiac surgeons and vascular surgeons who may master one procedure but not another. Only 50% of the US training programs in coronary interventions provide some exposure to these types of procedures; in addition, there are only few centers (usually academic), which offer a formal, full year of designated SHD training [4-5]. In most cases, this training program is offered to candidates who have completed their full training in: a) internal medicine, general cardiology and interventional cardiology, b) general surgery and cardiothoracic surgery, c) pediatrics and pediatric cardiology.

There is a consensus agreement among interventional cardiology training program directors that in the near future a training curriculum will be officially established and applied, as is the case with medicine, cardiovascular diseases and interventional cardiology [8-9]. At the moment, we only have some expert consensus recommendations on what would be required for training [4-5]. Lately there have been also some recommendations on operator and institutional requirements, but mostly for transcatheter valve repair and replacement [10-13].

What is certain is that the training should not consist solely on how to perform specific procedures by teaching on how to use any specific device. Such a curriculum will need to include, among others:

A. Master the anatomy, physiology, pathology and clinical patient management of SHD.

B. The development of technology and procedural skills of transcatheter therapy in SHD, and more importantly, to teach trainees to think outside the box. How to perform all kinds of access; know the type and performance characteristics of wires, catheters and devices.

C. Extensive training in all imaging modalities used at the diagnosis and treatment of SHD. This will include fluoroscopy, two-dimensional and real-time 3 Dimensional transthoracic (TTE) and trans-esophageal (TEE) echocardiography, intracardiac echocardiography (ICE), 3D/4D Computed Tomography (CTA), Cardiac Magnetic Resonance imaging (CMR), Positron emission tomography (PET scanning) and the use of Fusion imaging technology.

D. The team approach: Perhaps, one of the most important aspects to be taught to trainees is learning on how to work in a multidisciplinary team. SHD requires contributions from many experts and at all levels of patient care, from the diagnosis and assessment to procedural performance. Like in the Apollo 11, success depends on the function of each team member.

At present, there is no official government budget for the training of SHD interventionalists. Usually, the costs of training are covered by their respective clinical departments or by industry grants. We believe that the time has come for full support, like other AC-GME programs, with the possibility for combined efforts with the Federal Government and Industry. Undoubtedly, with increasing age of the population and the prevalence of SHD and the improving results in current SHD interventions, there will be a continually growing demand for the SHD interventionalist, and, optimistically, training standards and their means of financing. Finally, the Apollo 11 returned home, and remains until today a symbol of human victory. Let us hope that SHD procedures are another glorious human victory. We believe that these small steps are becoming now one giant leap the field of Structural Heart and that their respective procedures will be here to stay.

Conflict of Interest

The authors have no conflict of interest relevant to this publication.

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