

Sheldon Goldberg, MD

One of the pioneers in interventional cardiology discusses the role of simulation in training physicians, how to improve interventional cardiology fellowships, and how he is working to prevent fatal myocardial infarction.

Please describe the scope of interventional practices at Hahnemann University Hospital.

We have a very broad scope of practice at Hahnemann. Approximately 3,000 procedures are performed per year, which span almost all aspects of interventional cardiovascular medicine, including complex coronary stenting and treatments for structural heart diseases such as atrial septal defects, ventricular septal defects, patent foramen ovale, and paravalvular leaks. In addition, we have a robust program in peripheral and carotid artery intervention that has been in existence for more than a decade. Our trainees develop experience in nearly all aspects of interventional cardiovascular medicine. We emphasize careful judgment in deciding case selection and a deep understanding of the limitations and complications of interventional techniques, with a focus on patient aftercare.

What is the role of medical simulation in educating health care professionals?

We have been involved with medical simulation for a number of years and have created programs covering a variety of topics in interventional cardiovascular medicine. It is a great way to present physicians and teams with situations that they might not encounter in everyday practice. Rather than experiencing complications for the first time with real patients, physicians can develop pre-emptive strategies to avoid these situations and to resolve them if and when they arise. Simulation is also very valuable for both cognitive and technical skill development. Sophisticated simulators can be programmed in such a way as to query trainees' knowledge of the evidence base, as well as provide a means of performing procedures with maximal efficiency and optimal utilization of resources.

The simulator can also be used to test the skills of trainees and practicing physicians. For example, the American Board of Internal Medicine has a simulation examination that is used as part of the recertification process in interventional cardiology. However, I must say that simulators are not stand-alone tools or substitutes for teaching. The simulator is an educational aid and should be considered in that context. We still need dedicated teachers.

Is there anything that you would like to see improved in terms of either simulation devices or the way they are being used?

I would like to see more widespread use in training programs. Certain simulators have strengths regarding technical manipulations (ie, the haptics are very good), whereas the overall clinical context may be less developed. Other simulators have very well-developed clinical scenarios, but the haptics are not as realistic. Most of all, I think the quality of the simulation is going to depend on the people who write the cases and on the cases themselves, which must be selected according to valuable educational content.

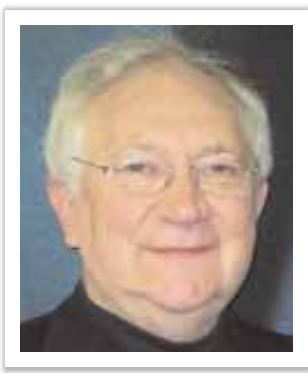
Can you tell us about the current status of education for interventional cardiology fellows? What areas still need improvement?

There are a multitude of training programs around the country. Some programs have excellent resources in certain areas of interventional cardiology, with less developed training in other areas. I would like to see a more uniform approach so that trainees get exposure to all aspects of interventional medicine. It is a remarkably burgeoning field that has expanded so rapidly over the years, and it is understandably difficult for each program to keep up. We need to develop resources to make the training experience more uniform across the United States.

What do you think is the next frontier in the treatment of coronary artery disease?

We have organized our medical systems to deal with the enormous problem of ST-elevation myocardial infarction, and we have developed systems to administer the optimal therapy and perform emergency percutaneous coronary intervention with ever-diminishing door-to-balloon time. However, 50% of patients who have myocardial infarctions never reach the hospital, and one of the great challenges we face is to address that patient population. I am currently involved with Prevent AMI, a consortium that seeks to screen, detect, and treat patients who are at risk for myocardial infarction and sudden cardiac death. We plan to use multislice computed tomographic angiography and optical

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frequency domain imaging, which is a technique that helps to identify and characterize plaques that are at risk for rupture, and we will test the effectiveness of a protective implant to prevent plaque rupture. If this strategy is implemented, we would have a method in place to screen and detect plaques before they rupture and cause myocardial infarction, similar to the way that we now screen for colon cancer. Hundreds of thousands of lives could be saved in this country alone. The prevention of myocardial infarction and sudden cardiac death would be an innovation in the therapy of cardiac disease.

How is the technology progressing in being able to detect vulnerable plaque and treat it?

One of my terrific colleagues at Massachusetts General Hospital, Dr. Tearney, has developed the area of optical frequency domain imaging, and we plan to make this technology available for patient studies within the next 2 years. We are going to be studying a very high-risk population with acute coronary syndromes by performing three-vessel optical frequency domain imaging and intravascular ultrasound. Through this endeavor, we hope to characterize cap thickness and markers of inflammation, along with structural features of the plaque, to develop a threshold score that can predict events. The first phase of the study will be a natural history study, and the second phase will be a randomized treatment phase with a local plaque stabilizer.

What do you consider to be the highlights of your career?

My training experience has definitely been a highlight. I was very fortunate to receive my fellowship training at Brigham and Women's Hospital. I had outstanding mentors who are leaders in the cardiovascular field, including Drs. Eugene Braunwald and William Grossman, who instilled in me a passion for developing innovative techniques. After I left Brigham, I was the principal investigator in the STRESS (Stent Restenosis study) trial, which established the role of coronary stents in clinical medicine. I will never forget the day when a representative from Johnson & Johnson walked into my office with the Palmaz/Schatz stent in his briefcase and showed it to me. He asked if I thought it would work in treating coronary artery disease, and I said that I would be willing to give it a try. We went down to San Antonio and worked with Drs. Julio Palmaz and Richard Schatz in lab experiments and then organized a study group composed of leading interventional cardiologists from around the world. It was wonderful to be able to collaboratively bring a novel idea to fruition and have an impact on so many lives.

Another highlight has been working with and learning from people who are a lot smarter than me. I have fabulous colleagues at Hahnemann who have educated me in many of the new techniques in interventional cardiology. For example, I learned how to perform carotid stenting from Dr. Dan McCormick, my colleague and one of the world leaders in carotid stenting. I have really been blessed to be surrounded by individuals who have stimulated me and pushed me into new areas of endeavor. ■

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