The Morphing of Cardiovascular Specialists
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The rate of discovery and progress in medicine continues to accelerate, and nowhere are the changes greater than in the area of cardiovascular diseases. During my career alone we have witnessed the development of echocardiography and nuclear imaging, angioplasty and interventional procedures, cardiac-defibrillators and ablation of arrhythmias, as well as many other advances. These new technologies have brought with them new roles for the cardiovascular specialist, and have transformed the specialty and how and where it is practiced. I believe we are on the threshold of a much greater transformation of the specialty, and one which will involve not only what services are delivered and where, but also by whom they are provided.

Prior technological developments have led to the now familiar echocardiography, catheterization, and electrophysiology laboratories present in all major medical centers. Concomitantly, cardiologists have evolved to become echocardiographers, interventionalists, and electrophysiologists. Although these changes have had some impact on other disciplines, the major effects have been primarily within the specialty of cardiology. The new technological developments such as cardiac magnetic resonance (CMR) imaging, computed tomography (CT) imaging, carotid stenting, and percutaneous insertion of heart valves will likely cause more intense subspecialization within cardiology. Moreover, they will cross boundaries into procedures previously provided by other specialties.

Simultaneously, of course, these other disciplines are seeking ways by which they may participate in the delivery of these new services. I believe that the result will be a blurring of the borders between specialties in many areas, and a morphing of the cardiovascular specialist into a different animal than presently exists.

Perhaps nowhere is the potential for change in cardiology greater than in the area of noninvasive imaging. Advances in CMR continue to expand the clinical applications of the technique, and to make examinations more feasible and affordable. The emergence of noninvasive coronary angiography by means of multislice CT holds the potential for having the greatest impact on cardiology. Although the ultimate ability of CT and CMR to visualize the coronary lumen and wall remains to be determined, it is already clear that major obstruction in the proximal coronary arteries can be recognized with good accuracy. The addition of physiologic information, such as that provided by positron emission tomography often obtained from the same gantry, will further refine the accuracy of noninvasive assessment of coronary disease. The potential applications of such technology bring to mind the example of photocopying. When Xerox first introduced photocopying, it was believed that it would merely replace carbon paper. However, the ease and availability of copying has resulted in the duplication of many more documents than initially thought. The same response may well occur with noninvasive coronary angiography.

As CMR and cardiac CT are introduced into clinical practice, an obvious question is who will deliver the service. Radiologists have generally provided magnetic resonance and CT procedures, have great expertise in physics and instrumentation, and have traditionally had access to the large amount of capital necessary to acquire the technology. Cardiologists, of course, have unique expertise in cardiac anatomy and pathophysiology and crucial knowledge of the patients to be examined. They can best incorporate the findings into the continuing care of the patient. However, even within cardiology there resides different areas of expertise. Noninvasive cardiologists are familiar with tomographic images while invasive cardiologists deal with the nuances of coronary anatomy and its treatment by percutaneous approaches. While one could argue vigorously, and many do, about who is best suited to provide these services, logic dictates that the optimal solution requires the merging of the individual areas of expertise. In my mind, this sets the stage for close collaboration or for the emergence of a new specialist with both cardiologic and radiologic skills. It seems equally obvious to me that this will require special training and that it is possible that such a “morphed” cardiologist could evolve from either discipline.

The issues are similar with regard to percutaneous carotid intervention and other emerging technologies for peripheral vascular disease. Such procedures clearly hold the potential for earlier intervention on a larger number of patients. Radiologists have generally provided these services and have dealt more commonly with peripheral vascular anatomy and pathophysiology. Cardiologists, of course, are immersed in vascular disease, deal with interventions on small vessels supplying vital organs, and care for the systemic aspects of atherosclerosis. Vascular surgeons have the greatest focus on peripheral vascular disease and are experienced in both medical and surgical treatment. Here again, the optimal provider will be an individual who brings to bear the skills of all groups. Already, cardiologists are expanding their study of peripheral vascular disease and its diagnosis and
management, and vascular surgeons are aggressively seeking training in the catheterization techniques.

Perhaps the most intriguing possible morphing of the cardiovascular specialist lies in the development of percutaneous techniques for the treatment of valvular heart disease. Several patients have been treated for aortic stenosis with percutaneous implantation of stent-mounted prosthetic valves (1). In addition, a variety of percutaneous approaches are being applied to mitral regurgitant lesions. While the implantation of valvular prostheses has traditionally been the province of the cardiac surgeon, cardiologists clearly hold the skills with regard to interventional catheter procedures. Recognizing the need for many types of expertise, a position statement generated and endorsed by the Society of Thoracic Surgeons, the American Association for Thoracic Surgery, the Society for Cardiovascular Angiography and Interventions, the American College of Cardiology Foundation, and the American Heart Association has called for an interdisciplinary collaboration in the development of percutaneous heart valve technology (2). While it is unlikely that even the most aggressive interventional cardiologist would ever undertake cardiac surgery, it is not beyond possibility that a cardiac surgeon might cross-train in a cardiology fellowship to percutaneously insert prosthetic valves.

It is clear from the foregoing that the nature of cardiovascular specialization is poised to undergo another major transformation in response to technological advances. There are, of course, a number of ways in which such change could evolve. It appears that the most powerful and first instinct is that of self preservation, and some are already staking out turf. However, while a tug of war may continue, the winner will always be the group with the greatest knowledge and expertise. Therefore, the turf will always belong to those who have acquired multidisciplinary skills. As various individuals do this, I see a blurring of the boundaries between disciplines, and perhaps the emergence of new types of cardiologists. Coupling ultrasound and radioisotope procedures with the new CMR and CT techniques could form the basis for the cardiovascular imaging specialist. The training of such individuals would consist of both cardiologic and radiologic experiences, and time directed to patient care would be reduced in favor of interpretation of studies. Likewise, the borders of interventional cardiology may blur with that of interventional radiology and peripheral vascular surgery. The pool of individuals for this new specialty could be drawn from all disciplines, and they would focus upon percutaneous treatment of vascular disease. Although it is unlikely that surgeons would cross-train in interventional cardiology, it may be that some physicians in each group will focus so strongly on the percutaneous implantation of mechanical cardiac devices that it may occupy the vast majority of their time. The effect that such changes may have on cardiology are hard to predict. Although these specialists would be further distanced from their colleagues in general cardiology or other subspecialties, such as electrophysiology, they may serve to calm the tensions between major disciplines such as cardiology and radiology. This in itself would be of enormous benefit. In any event, this evolution would be consistent with the trend toward specialization occurring in all phases of contemporary life. The morphing of cardiovascular specialists will be consistent with the apparently widely held current concept that it is better to know everything about something than something about everything.

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