Editorial

Pretty Pictures: Assessing the Value of Cardiac Imaging

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This issue of the Journal includes three papers which employ the latest in high technology ultrasonic imaging to delineate various features of cardiovascular disease. Dabiran et al took advantage of the high resolution, noninvasive nature of echocardiography to detect subtle differences in cardiac adaptation to dynamic versus static exercise. Sadeghian et al employed color Doppler to document the degree of mitral regurgitation in patients undergoing CABG with and without mitral valve repair. Piranafar et al used recently developed technology for tissue Doppler imaging to detect intracardiac shunts in patients with congenital heart disease.

These papers all reflect our enthusiasm for new and increasingly sophisticated imaging technology. Surely, modern medical imaging is one of the most important scientific accomplishments of the last century, if not the last millennium. The potential for this new technology to provide enhanced and expanded understanding of fundamental disease processes such as atherosclerosis, myocardial infarction, and other acquired and congenital heart diseases is truly mind boggling.

However, unrestricted growth in imaging, particularly cardiac imaging, has become an increasing burden on our already over-burdened health care budgets. We are being now being called upon to validate the value added by new imaging tests and to measure the direct impact each imaging test performed has on the care of each individual patients. In developing new procedures and refining the application of existing modalities, we need to ask not just how a given test compares to another test, or how elegantly a test can delineate anatomic structures, but rather, how does performing a given test alter clinical decision making. Superior image quality and higher resolution must translate into clinically relevant information which ultimately improves patient care.

This paradigm shift in how we think about imaging is not really all that new. The fundamental goal of medical practice has always been to help our patients feel better and live longer. The production of highly detailed, anatomically accurate and esthetically pleasing images may help achieve this goal, but producing "pretty pictures" is not good enough by itself. Wennberg and his colleagues[1,2] have pointed out that recent rapidly expanding use of noninvasive imaging is not explained by increasing disease prevalence. This increased use of noninvasive imaging may confer benefit for some, but may not help others and certainly increases costs. We must identify those patients who benefit from imaging and avoid imaging those in whom imaging has little chance of influencing management or the ultimate patient outcome.

The value of cardiac imaging begins with technical excellence - highly trained and innovative people using well engineered equipment to image seminal aspects of a disease process. The technical quality of the imaging process and the accuracy of image interpretation must be assured and improved on a continuous basis, with iterative checks against other corroborating clinical data.

Technical quality and accuracy are essential first steps for value-based imaging, but this is not enough. The next step in diagnostic imaging is to exclusively employ imaging in appropriate patients, and to avoid wasteful or even potentially harmful imaging of patients who do not need the test. Only patients for whom the marginal health benefits of the imaging procedure exceed their marginal risk should be imaged.[3] The cost of imaging must also be weighed against the benefit. Definition of appropriateness and assessment of the contribution of imaging to patient outcomes is especially difficult, but nonetheless essential. In some cases, we must pursue randomized controlled trials to prove the value of imaging. However, not all evidence is amenable to collection in such trials.[4] Real world registries provide important data, and use of surrogate endpoints can supplement achievement of hard outcomes.[5]

Those of us involved in developing and applying new imaging technology share with all physicians the desire to deliver the best health care possible to each and every one

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of our patients. Responsible stewardship of the resources available to us requires that we carefully examine the evidence supporting the use of imaging in any given circumstance, as we try to provide the right imaging procedure to the right patient at the right time.

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