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iVIEW

EDITOR'S PAGE

Cardiovascular Imaging Quality—More Than a Pretty Picture!

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For years, cardiac imaging centers across the U.S. have enjoyed tremendous success, with growth rates frequently exceeding 10% per year (1,2). These years of prosperity were spawned by an abundance of evidence on a high degree of published diagnostic accuracy as well as data on risk assessment in diverse patient populations (3–8). Heretofore, cardiac imaging had never enjoyed such a prominent and expansive body of evidence as to the role of imaging modalities, such as echocardiography or myocardial perfusion single-photon emission computed tomography (SPECT), to guide patient management. This growth in cardiac imaging occurred concurrently with and perhaps impacted upon declining cardiovascular morbidity and mortality (9). Since 1979, declines in coronary heart disease mortality have exceeded 30% within the U.S. population (9). Yet, the growth in cardiac imaging often outpaced that of many other medical procedures (10). For example, the Medicare Payment Advisory Commission reported in 2005 that imaging grew at a rate nearly double that of other procedures (10). For payers, growth in cardiac imaging encumbered an ever-increasing percentage of health care spending. In 2003, Medicare payments for myocardial perfusion SPECT exceeded $1 billion, rendering it one of *the* "big ticket" items in the health care budget (AMA-RUC, personal communication, 2006). New technology developments in computed tomography (CT) and magnetic resonance (MR) imaging, as well as the initial widespread purchase of this equipment nationwide, prompted additional concern on the part of payers as to the potential for further financially catastrophic growth rates in cardiac imaging.

Consequent to this, numerous efforts were put forth in order to contain rising health care costs, including deficit reduction act–induced cuts in reimbursement as well as utilization management strategies (e.g., pre-certification, radiology benefit managers). These payer initiatives were meant to halt unrestrained use of imaging with a variable effect on accelerating health care costs. It should be noted that for those of us within the cardiovascular medical community, it was not that imaging growth was the result of excess per se, but that the procedural volume could not be justified or evaluated as appropriate. One message that arose from the focus on imaging utilization was that the "true" nature of utilization, whether it be under-use or over-use, was unknown.

The Institute of Medicine roundtable on evidence-based medicine described contributing factors to excessive health care costs, including the rapid pace of medical innovation outpacing the development of appropriate or effective strategies for use (11). The medical community has frequently been left to render clinical decisions without the benefit of appropriate study results or with data that has limited applicability to "real world" settings. Thus, despite an abundance of high-quality prognostic and diagnostic evidence, the growth in imaging utilization did not include evidence that could be used to evaluate and guide daily clinical practice decisions that impact the lives of our patients. An initial response led by the American

College of Cardiology (ACC) put forth criteria to define appropriate use of common cardiac imaging procedures, such as myocardial perfusion SPECT (12), echocardiography (13), MR, and CT (14). The manifest destiny from the appropriateness criteria is that all imagers must be active in the referral process to educate and guide primary care physicians on appropriate use of imaging modalities.

However, moving beyond the appropriateness criteria, the ACC in combination with Duke University Cardiovascular Imaging Center held a think tank, first held in 2006, to put forth a "road map" for achieving quality in imaging (15); a follow-up conference was held in October 2007. This issue of *JACC: Cardiovascular Imaging* includes a CVN interview with the Conference Chair, Pamela Douglas, MD, MACC. Major goals of these 2 think tank meetings have been to devise strategic efforts to define and assure quality cardiac imaging, including appropriate test selection. A central theme in this year's conference was to provide tangible and realistic structural and process indicators of imaging health care quality. Quality health care may be defined using a triad of factors composed within the structure or laboratory setting (e.g., laboratory accreditation), processes of test performance and within the episode of care (e.g., structured reporting), and outcome indicators. For cardiac imaging, indicators of quality testing include: appropriate test selection; laboratory, technologists, and physician subspecialty certification and training; as well as structured reporting. The ACC/Duke think tank also engaged in discussion around this latter component of improved patient outcome, a more difficult measure to implement nationwide. Similar to the ACC's National Cardiovascular Data Registry (NCDR) for Cath/PCI, which has been instrumental in devising procedural outcome standards for diagnostic coronary angiography and percutaneous coronary interventional procedures (16), there has been exploration of possible registries whose main purpose would be to identify achievable, quality indicators as well as to provide support for appropriate test utilization with the goal to achieve optimal patient outcomes. This effort is part of a more global focus within medicine to devise more patient-centric strategies of health care quality. Expanding on evidence offered over the last few decades on diagnosis and risk assessment, any growth in cardiac imaging must now be justified with supportive data revealing improved patient outcomes. These efforts on devising quality imaging, spawned within the ACC/Duke think tank, have expanded to include the support and collaboration of all subspeciality societies within cardiology, including the American Society of Echocardiography and American Society of Nuclear Cardiology, as well as the American Heart Association and the American College of Radiology.

Based on this think tank, what do we envision for the future of cardiac imaging? The future of cardiac imaging depends on forging locally based, patient-centered "safety nets" to support imaging decisions and to evaluate medical management decisions. Thus, mandatory laboratory accreditation will be a core mainstay for any imaging laboratory and will include continuing quality initiatives as a quality driver as well as the potential for data repositories to guide local quality initiatives. Moreover, image acquisition and interpretation will be standardized with efforts underway to identify higher-quality or "gold star" imagers. As part of this effort, structured reporting is a key element to ensure adequate documentation and relaying of critical factors necessary for referring physicians to implement effective decisions based on imaging risk markers.

As part of this plan, cardiovascular imagers must actively engage in the discussion about the future of quality initiatives that seek to focus patient-centered outcomes at the heart of imaging-driven care. This is particularly true when the discussion includes measurement of local outcomes derived from laboratory registries. It should be made manifest that prior evidence included critical data on population test effectiveness. However, if we are to achieve patient-oriented interpretation with a goal that an added test or referral within the patient work-up must improve outcomes, then our evidence-base must now move beyond the research arena. As this discussion unfolds, however, we believe that the arguments and strategies must be realistic and provide iterative approaches to registry development so as to minimize laboratory burden. This being said, the strategies must reflect how the test is used clinically and not embark on overly ambitious projects requiring sub-

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stantive local investments aimed at defining a net improvement in health outcomes, particularly within the current environment of declining reimbursement. In many cases, staff labor for patient enrollment and source documentation for the ACC's NCDR require substantial local investment that is, in many cases, unrecouped. Similar strategies within the less-experienced and higher-volume imaging laboratories could have disastrous economic consequences, with the net result being potentially unreliable patient outcomes data. Given the expertise of the ACC/Duke think tank leadership, one can be assured that the path forward will be measured.

As standards change within local laboratories, it is clear that the culture of clinical research for cardiac imaging must also evolve to be decidedly more expansive. Given our new standards of quality imaging, the necessary and sufficient evidence base for new technology must exceed the current, minimal standards of diagnostic equivalence or validity. In today's environment, the majority of our prognostic evidence arises from few academic centers with little to no financial support for such ventures. Moreover, funding for cardiac imaging research rarely approaches the investment placed in drug development. In order to achieve the levels of quality imaging that we see for the future, industry and governmental agencies must prioritize and invest in a global strategy for new imaging technology that includes prognosis and cost efficiency data from diverse patient series. A lack of sufficient clinical outcomes data has hindered recent expansion for new CT and MR technology.

We look forward to the progress set forth in this and future ACC/Duke imaging quality think tanks. It is an interesting time in cardiac imaging, with a wealth of available data and exciting new developments in molecular, vascular wall, and 4-dimensional imaging. However, this is a time when all relevant and interested parties—private practice and academic imagers, industry, the National Institutes of Health, the Food and Drug Administration, and public and private payers—must all coalesce toward the same goal of devising high-quality standards for quality cardiac imaging.

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