As seen in **Hospital News**

How Many Slices Does It Take?
Non-invasive Cardiac Imaging: New Advances in Cardiovascular Care and Technology

By Ross Swanson

While the prevalence of cardiovascular (CV) disease has risen proportionately with the aging of the US population, at the same time, mortality rates related to CV disease have dropped over the last decade. This seemingly contradictory scenario can be attributed to several factors, such as greater access-to-care, increased use of statins, and improved technology.

Indeed, the diagnosis of CV disease has been much improved with recent advances in imaging modalities that allow detection by non-invasive means, which can lead to earlier, more effective treatment. Corazon believes that the advent of the multi-sliced CT (MSCT, commonly referred to as 64-slice CT) could have a great impact on the diagnosis of coronary artery (or other vascular) disease, even though many predicted the impact of this technology wouldn't be fully realized until 2009. As cardiovascular technology is continually refined and improved, the number of non-invasive medical imaging modalities could double over the next 10 years.

The 'gold standard' of detecting coronary artery disease (CAD) has been diagnostic cardiac catheterization ("cardiac cath"), an invasive procedure whereby a cardiologist inserts a catheter into a large artery and then advances it into the heart. The process of diagnosing CAD is now moving towards MSCT technology because the high-resolution images allow plaques to be viewed as they are just forming inside the blood vessel wall. Though traditional CT lacked the spatial resolution to adequately see coronary arteries and other small blood vessels in the beating heart, with an increase in the number of detectors to 64, resolution has improved to now allow a detailed view of coronary anatomy. This process, "Coronary Computed Tomography Angiogram" or CCTA, has generated much public interest, having been featured in segments on Oprah Winfrey and the TODAY Show.

Recent studies prove MSCT CCTA to be as reliable as the standard angiography in diagnosing vascular disease with the ability for rule-out 90% of the time. MSCT is even better at ruling-in vascular disease in greater than 92% of cases[i]. Furthermore, MSCT can even detect coronary lesions that have been missed through standard angiography. But, due to this highly-accurate sensitivity for CAD diagnosis, the cardiology industry has been abuzz that this "disruptive" technology will radically decrease volumes of diagnostic cardiac catheterizations.

To remain on the forefront of industry change, Corazon has partnered with Cardiovascular Innovations, Inc.[ii] (CVI) to establish benchmarking data related to the use of MSCT and its impact in the clinical setting. According to the CVI Registry (12 participating sites in the US), initial results have revealed a 5% reduction in cardiac caths and an 8% reduction in nuclear volumes. However, angioplasty (interventional) procedures at all sites using 64-slice CT have increased between 6-16%. The MSCT is being used predominantly in patients with low-to-moderate risk factors, with the greatest indication being unspecified chest pain. As of today, this technology has NOT been granted acceptance as a screening tool by payors and professional organizations such as the American Colleges of Cardiology and Radiology.

In the last two years, MSCT technology has taken on several roles related to cardiac assessment in the full continuum of CV care, the earliest and most clearly-defined being the evaluation of chest pain. As a result, CCTA has also become the triage tool for risk-stratifying chest pain patients, replacing other non-invasive tests. Indeed, CCTA has the ability to greatly enhance patient throughput, as this test has both a rapid procedure and interpretation time when compared to cardiac cath. It has also been used as a clearance mechanism for patients prior to non-coronary cardiac surgery. Some facilities even use CT to evaluate patients post-procedure prior to discharge. For instance, one of Corazon's clients uses MSCT to evaluate the placement of endovascular stent(s) in the treatment of abdominal aortic aneurysm (AAA) repair as part of a routine care protocol.

So what does the future hold? The newest MSCT devices can now capture 256 slices, and have just begun trials in the US. With greater image quality in a shorter acquisition time, the 256-slice CT can completely scan the entire heart (and other large organs) in a single rotation of the 256 detectors. Early data reveals a 60-70% reduction in radiation exposure compared to standard CT.

Rigorous planning for the acquisition of MSCT is paramount for a hospital's success with this new technology. Corazon recommends that the ability to perform CCTA studies be treated as an entirely new service for the cardiovascular service line. There are fairly large capital expenses (typically greater than $1M) associated with the equipment, as well as considerations for physical space needs and additional staffing. Financially, CCTA can be a challenge, too. Corazon has noted that reimbursement for CCTA has varied greatly by region, with payments determined by local coverage. As of 2006, CCTA has specific Category III CPT Codes, though these are without accompanying RVUs that determine reimbursement. Corazon predicts a more rapid adoption of this technology as payment mechanisms are refined. And finally, physicians who are appropriately credentialed to order and interpret exams are paramount.

Questions as to who 'owns' the new equipment, where it is located, and who performs and interprets the studies are still left for many hospitals currently evaluating the technology. Corazon recommends taking an objective approach to evaluate the clinical, quality, market share goals, and financial implications, always considering the cardiac patient's needs at the center of decision-making for MSCT technology.

Ross is a Director at Corazon, a national leader in specialized consulting and recruitment services for CV program development. Corazon combines strategic business planning, market and financial analysis, feasibility studies, clinical operations, program implementation support, Heart Hospital design, best practice benchmarking, executive search, and staff/leadership education for newly established or existing heart and vascular programs. Corazon is one of the 2006 "Best Places to Work in PA." Call 412-364-8200 or visit www.corazoninc.com.

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[i] Ofer, A., et.al. "Multi-detector CT Angiography of Peripheral Vascular Disease: A Prospective Comparison with Intra-Arterial Digital Subtraction Angiography." *AJR*, 2003: 180 (3). 719-24.

[ii] Cardiovascular Innovations, headquartered in Beaufort, SC, assists cardiovascular care organizations with integrating and optimizing emerging services for their clinical and economic benefit. Visit www.cvinnovations.new for more information.