Significant disadvantages for Multi-detector CT (MDCT) in calcium scoring

Coronary calcium scoring is now offered by an unprecedented number of hospitals and diagnostic imaging centers. However, there still remains an important discussion regarding whether or not MDCT can perform the test with comparable accuracy to an electron beam tomography (EBT) scanner.

Unlike EBT, MDCT uses retrospective ECG gating requiring the post scan reconstruction of the acquired images based on a given interval of the cardiac cycle. In the case of calcium scoring, different intervals yielded different scores. German investigators Jörg Barkhausen from University Hospital in Essen, along with lead investigator Dr. Peter Hunold and Drs. Thomas Schlosser, Ji-Sou Sawatzki, Axel Schmermund and Hilmar Kühl, reported their findings at the 2005 RSNA meeting in Chicago:

- Unlike EBT, which is comfortable with virtually any heart rate, the need for MDCT to use beta-blockers undermines the simplicity and overall
- Using a 16-slice MDCT scanner, the calcium scores achieved were vulnerable to motion artifacts
- MDCT scores can vary widely based on the reconstruction interval, and the reconstruction with the least motion artifact—not the highest score—is likely the most accurate
- MDCT calcium score variability was more pronounced for patients with lower calcium scores, but in some cases the differences were still sufficient to alter the patient's risk status
- Variability is enough to impact the personal risk estimate for each patient

Interestingly, the 'science' behind MDCT calcium scoring is based entirely on nearly two decades of peer-reviewed validation from EBT technology, whose superior image acquisition speeds (not number of "slices") result in a temporal resolution best suited for cardiac applications – regardless of the patient's heart rate.

Earlier studies (Becker et al, American Journal of Roentgenology, May 2001, Vol 176:5, pp. 1295-1298) comparing EBT to four- and eight-slice MDCT scanners have also shown that MDCT scanners frequently mischaracterize true risk, and are especially problematic with scores less than 100. This is particularly significant in men under 50 and women under 63 years of age since calcium scores between 10-100 could mean the difference between low, intermediate and high risk. The conclusions of the German team using a 16-slice scanner further demonstrate the challenge.

For more information, or for copies of the studies mentioned here, please call us at 760-804-9929 or visit www.innervisionwellness.com.