

Software System Yields Boost in Image Quality

Greater image quality, but not diagnostic accuracy, was shown in study of Astonish technology.

BY DOUG BRUNK
San Diego Bureau

SAN DIEGO — Postacquisition processing using Astonish software technology results in improved image quality and similar diagnostic accuracy to conventional 64-frame filtered back-projection processing, even at a 32-frame SPECT acquisition, results from a multicenter study showed.

“These findings confirm the value of half-acquisition Astonish, which may lead to important improvement in laboratory efficiency,” Dr. Gary V. Heller said at the annual meeting of the American Society of Nuclear Cardiology.

Manufactured by Philips Medical Systems, Astonish is a program that includes depth-dependent collimator resolution and scatter correction to permit reduced angular or shortened acquisition times.

Dr. Heller and his associates evaluated 221 patients who presented to three nuclear cardiology laboratories for clinically indicated rest/stress technetium-99m sestamibi or tetrofosmin single-photon emission computed tomography (SPECT) imaging. The purpose was to compare conventional 64-frame filtered back-projection processing with 64-frame (full-time) and 32-frame (half-time) Astonish processing. The researchers measured image quality of both stress and rest perfusion, image quality of rest and stress ECG-gated, diagnostic certainty of perfusion, diagnostic accuracy of the perfusion, and the size of the perfusion abnormalities.

Comparison of the three imaging methods was made in blinded fashion by consensus interpretation.

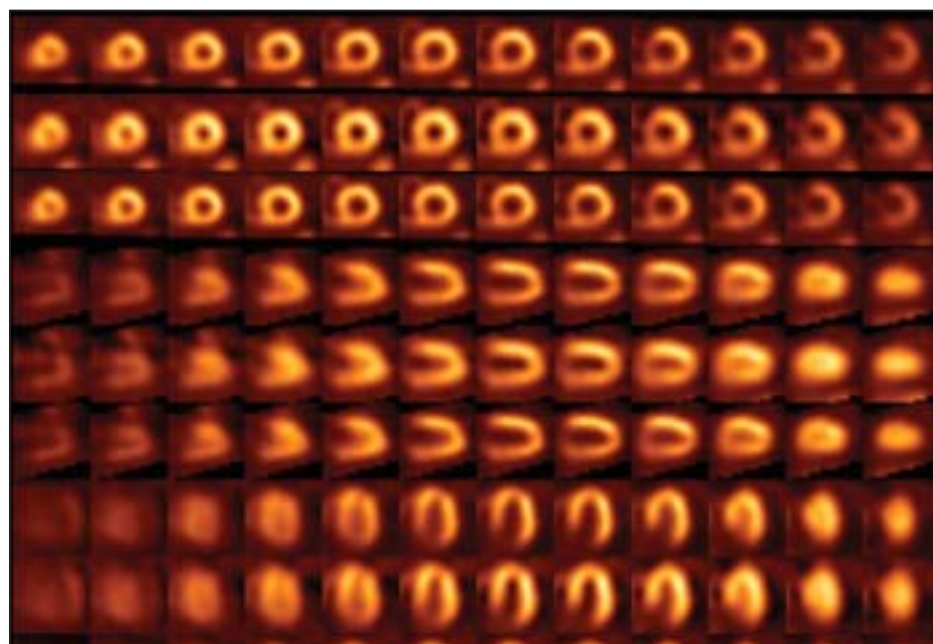
The mean age of the 221 patients was 65 years, and 36% were women. Their average body mass index was 30 kg/m².

The stress and rest perfusion image quality was “quite good” in all three groups, Dr. Heller said, although there were significantly higher rates of fair- or poor-quality images in the conventional 64-frame filtered back-projection group compared with the full-time and half-time Astonish groups.

There were also significantly higher rates of fair or poor stress functional image quality in the conventional group compared with the full-time and half-time Astonish groups. However, the rate of fair or poor rest functional image quality was the same between patients in the conventional group and the full-time Astonish group, but was slightly higher among patients in the half-time Astonish group.

Dr. Heller, director of nuclear cardiology at Hartford (Conn.) Hospital, reported that there were no differences in interpretive certainty of stress myocardial perfusion imaging between the three groups of patients. There also were no differences between the groups in the diagnostic accuracy of 50% stenosis, “although there was a trend toward reduced specificity with regard to patients in the half-time Astonish processing group,” he said.

The researchers observed significantly higher summed stress scores among patients in the half-time and full-time As-



In these perfusion images of normal stress, the top three rows show processing with 64-frame (full-time) Astonish. The middle three rows show processing with conventional 64-frame filtered back projection. The bottom three rows show processing with 32-frame (half-time) Astonish.

COURTESY DR. GARY V. HELLER

tonish groups, compared with those in the conventional 64-frame filtered back-projection group (10.7, 9.7, and 8.8, respectively), but there were no statistically significant differences in the summed rest score between the three groups (2.7, 2.4, and 2.6, respectively).

There were no differences between the groups in poststress ejection fraction between the three groups (a rate of 57% for all). The ejection fraction at rest was similar between the three groups (61% for the half-time Astonish group, 63% for the full-time Astonish group, and 62% for the conventional 64-frame filtered back-projection group).

“If labs use Astonish without changing acquisition times, it will result in higher-quality images, easier to interpret,” Dr. Heller concluded in a later interview. “If labs choose to improve efficiency by using half acquisition, the image quality is actually superior to filtered back projection.”

The study was funded with an unrestricted research grant from Philips Medical Systems. The company was not involved in the development of the study or in the interpretation of the results.

Dr. Heller disclosed that he has received grants from Philips Medical Systems and that he is a member of the company’s speakers’ bureau.

Epicardial Fat Linked to Worsening Cardiac Function

BY FRAN LOWRY
Orlando Bureau

NEW ORLEANS — The fat that surrounds the heart is associated with cardiac abnormalities, including low stroke volume and cardiac output, that are independent of body mass index, a study has found.

The finding casts doubt on the widespread practice of using body mass index (BMI) as an indicator of cardiovascular disease risk, Dr. Zhongjing Chen, of Boston University, said at the annual meeting of NAASO, the Obesity Society.

Dr. Chen and colleagues assessed 13 obese women with metabolic syndrome—but no recognized atherosclerosis—using magnetic resonance imaging. The patients’ average age was 47 years (range 30-59).

The women had a BMI of 30 kg/m² or greater and also had at least three features of metabolic syndrome. These included hypertension, dyslipidemia, central obesity, and insulin resistance.

“The limit for weight was 275 pounds, and for waist circumference 50 inches, because of the table weight and size limits of our scanner,” Dr. Chen said.

The researchers used special software developed by Boston University’s Center for Biomedical Imaging to calculate epicardial and periaortic fat and then analyzed stroke volume, end diastolic wall mass, and ejection fraction, as well as flow volume and peak blood velocity.

Both stroke volume and cardiac output were negatively correlated with epicardial and periaortic fat, and this negative correlation was statistically significant. Ascending aorta compliance also worsened in the presence of epicardial and periaortic fat.

However, there were no correlations between stroke volume, cardiac output, or ascending aorta compliance and the subjects’ BMI, Dr. Chen said.

“The major morbidities associated with metabolic syndrome are myocardial infarction and stroke. People have been correlating body mass index with these risks, but our results indicate that it’s the fat stores around the heart that are important risk factors,” she said in an interview.

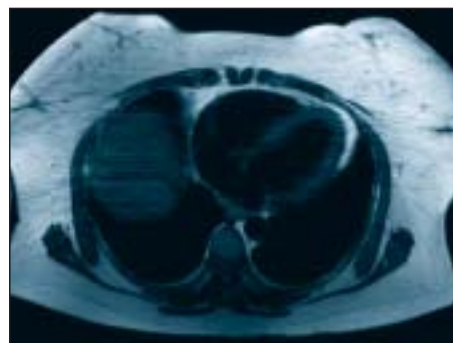
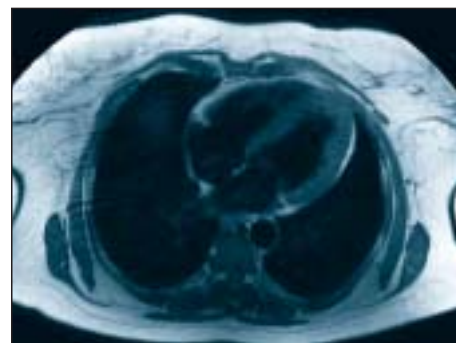
Dr. Chen added that MRI is noninvasive and therefore provides an excellent way of measuring epicardial fat and cardiovascular disease risk.

“Epicardial and periaortic fat can be di-

rectly detected and quantified with MRI to give us a good reading of cardiac function and vessel wall properties. We would like to see whether reducing those fat depots is associated with improvements in cardiac or vascular function. More studies are needed to answer this question,” she said.

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PHOTOS COURTESY DR. ZHONGJING CHEN

MRI images show epicardial fat (bright ring) in a woman with a BMI of 44 kg/m², left, and in a woman with a BMI of 34 kg/m². Counterintuitively, there was significantly more fat around the heart and aorta of the subject with the lower BMI.