

DE MRI Predicts Atrial Fib Recurrence Risk

BY MITCHEL L. ZOLER

BOSTON — Researchers recently devised a way to visualize fibrotic tissue within the left atrial wall noninvasively with MRI. Results from a new study that took this analysis a step further showed that patients with atrial fibrillation whose left atrium had high levels of fibrosis also faced a significantly increased risk of failing treatment by pulmonary vein isolation and septal ablation and revert to fibrillation.

The new method of left-atrial assessment with delayed-enhancement (DE) MRI may identify patients at the highest risk of early recurrence of atrial fibrillation following a noninvasive, pulmonary-vein isolation procedure, Dr. Saul Kalvaitis said at the Heart Rhythm Society's annual meeting.

Although this early finding needs replication by other groups, it has significant therapeutic implications, said Dr. Melvin M. Scheinman, professor and cardiac electrophysiologist at the University of California, San Francisco.

The report suggests that DE MRI may identify patients with atrial fibrillation who are not good candidates for ablation therapy because of high fibrosis content within the atrial wall. Recent research findings by other groups suggest that certain drug treatments reverse fibrosis. If such treatments prove effective, potentially nonresponsive atrial fibrillation patients might benefit from ablation, he added.

DE MRI is now a standard method for assessing ventricular scar, but Dr. Kalvaitis and coworkers at the University of Utah, Salt Lake City, are the first to apply the method to left atrial assessment, Dr. Scheinman said in an interview. A published report of the Utah group's

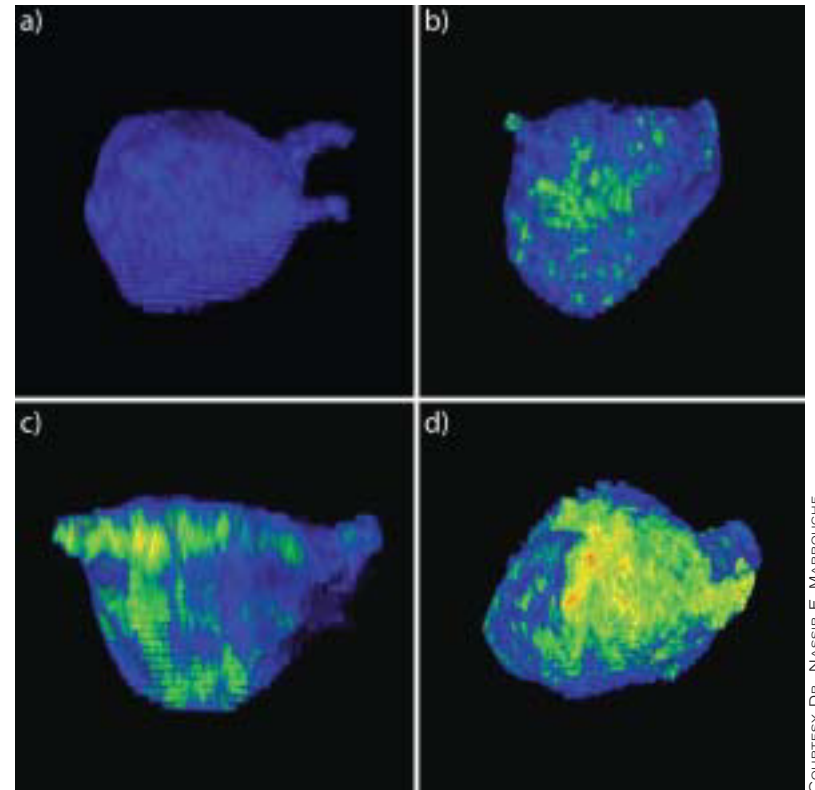
success with DE MRI for left-atrial assessment appeared in April (*Circulation* 2009;119:1758-67).

DE MRI involves infusing gadolinium contrast into the patient. Uptake of the contrast into fibrotic tissue occurs at a different rate compared with its entry into healthy tissue, and this difference allows assessment of the amount and location of fibrotic scar within the heart wall.

In the new study, Dr. Kalvaitis and his associates performed DE MRI exams on 62 patients with atrial fibrillation scheduled to undergo pulmonary vein antrum isolation and atrial septum ablation. Their average age was 64 (range 23-84), and two-thirds were men. On average for the entire group, structural modeling affected 17% of the left atrium.

The researchers divided the patients into three subgroups based on the extent of their left-atrial remodeling ratio: less than 15% (27 patients), 15%-35% (28), and more than 35% (7). The amount of left atrial fibrosis closely correlated with the ratio of left atrial remodeling, ranging from an average of 8% fibrosis in patients with the least remodeling to 46% in patients with the most remodeling (see box).

The incidence of an early recurrence of atrial fibrillation, defined as atrial fibrillation recurring within 3 months of the ablation procedure, closely correlated with the extent of left atrial fibrosis. The early recurrence rate was 19% in the subgroup with the lowest level of atrial fibrosis and 39% and 40%, respectively, in the two subgroups with higher amount of fibrosis.



Delayed-enhancement magnetic resonance imaging of left atria prior to ablation therapy, which has been processed as color three-dimensional models, indicates regions of abnormal enhancement in fibrotic tissue as green or other colors, and healthy tissue as blue.

COURTESY DR. NASSIR F. MARRUJCHE

Left Atrial Fibrosis and Recurrent Atrial Fibrillation

Left atrial remodeling ratio	Average fibrosis	Early atrial fibrillation recurrence*
<15% (n = 27)	8%	19%
15%-35% (n = 28)	19%	39%
>35% (n = 7)	46%	40%

*Within 3 months of pulmonary vein isolation.

Note: Based on a study of 62 patients with atrial fibrillation.

Source: Dr. Kalvaitis

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the House bill would go into effect in January 2011.

As written, the proposals would not affect lower-cost imaging services such as bone density testing and ultrasound.

It's appropriate for Congress and the administration to investigate how to make imaging more efficient, Dr. Jack Lewin, CEO of the ACC, said in an interview. But the best approach is not price cutting, he said. Instead, the ACC favors using appropriate use criteria at the point of care so that the ordering physician can quickly see whether the current science supports the use of a particular imaging study.

"We have the science," Dr. Lewin said. "We can give doctors who are ordering these tests for their patients the information as to which is the right test to order and when it's really indicated."

The widespread use of appropriate-use criteria tools would save the same

amount of money as the "blunt instrument cuts" proposed by Congress, Dr. Lewin said, but without some of the unintended consequences. For example, he predicted that the cuts as proposed would force some imaging centers to close their doors and would likely have the greatest impact on poor communities and ethnic minorities.

Dr. Michael Graham, president of the Society of Nuclear Medicine, said he is particularly concerned about the impact these cuts would have on access in rural areas. If the utilization assumption is significantly increased, some of the imaging facilities in rural areas will be forced to close, he said in an interview. For patients, that means driving twice as far to get to an imaging center and potentially waiting twice as long to get a study.

"The reality is that studies will not get done," Dr. Graham said. "It's going to be a major problem."

Imaging centers that stay in business and try to meet the higher utilization rates may experience their own problems, said Dr. Graham, professor of radiology and director of nuclear medicine at the University of Iowa in Iowa City. If you have a small center with one PET scanner, for example, and you try to run it 90% of the time, scheduling backlogs become inevitable, further frustrating patients and referring physicians.

Policy makers need to get more data about what the optimal utilization rate is for advanced diagnostic imaging equipment, Dr. Graham said.

In its proposed rule, the CMS cited a study from the Medicare Payment Advisory Commission (MedPAC) showing that CT and MRI equipment was being used 90% of the time or more.

However, data from the Radiology Business Management Association indicate that the imaging equipment in rural areas is operating about 48% of the time that an office is open, and that equipment in nonrural areas is operating about 56% of the time.

Policy makers, who are targeting advanced imaging modalities, should also consider the impact on lower-cost imaging services, said Dr. James Borgstede, vice chairman of the department of radiology at the University of Colorado in Denver and a past chair of the small and rural practice commission at the American College of Radiology.

When physicians go to a rural area to perform imaging services, they often use the higher-cost imaging to support the lower-cost services like plain film x-rays and mammograms. If the cuts make it cost prohibitive to perform advanced imaging, these physicians may not be able to justify coming to these rural communities to provide other services, he said in an interview.

"While we all want to provide health care for all of our patients, the government has to reimburse us appropriately," Dr. Borgstede said.

"We're small businessmen, and if you lose a dollar on every piece of imaging you do, you don't make it up on volume," he said.