

# SPECT Detects Early Ischemia in Lupus Patients

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MONTREAL — Patients with systemic lupus erythematosus demonstrated significantly more perfusion abnormalities on gated scintigraphy scans, compared with well-matched controls, in a small pilot study.

The observed differences may represent early manifestations of cardiomyopathy or silent diffuse myocardial ischemia, Dr. Scott Yoder and colleagues at the University of Rochester (N.Y.) Medical Center reported in a poster at the annual meeting of the American Society of Nuclear Cardiology.

Although several studies have highlighted the utility of gated single photon emission CT (SPECT) scans for the diagnosis of coronary artery disease (CAD) in SLE patients, no specific recommendations have been formulated. Dr. Yoder advocates routine cardiac screening of all lupus patients, and repeat scans roughly every 6 months for any patient

with identified CAD to track the progression and severity of the heart disease, as well as disease modification for SLE and treatment of underlying heart disease.

“Especially if they have evidence of heart disease on their initial screening, then every time they have an active flare of their SLE you should probably look to see if they have any worsening of their heart disease,” he said.

Lupus is associated with a two- to fourfold increased risk for coronary artery disease (CAD), and is typically difficult to diagnose because patients don’t have classic symptoms and tend to present late with heart failure or some other myocardial injury, Dr. Yoder said in an interview.

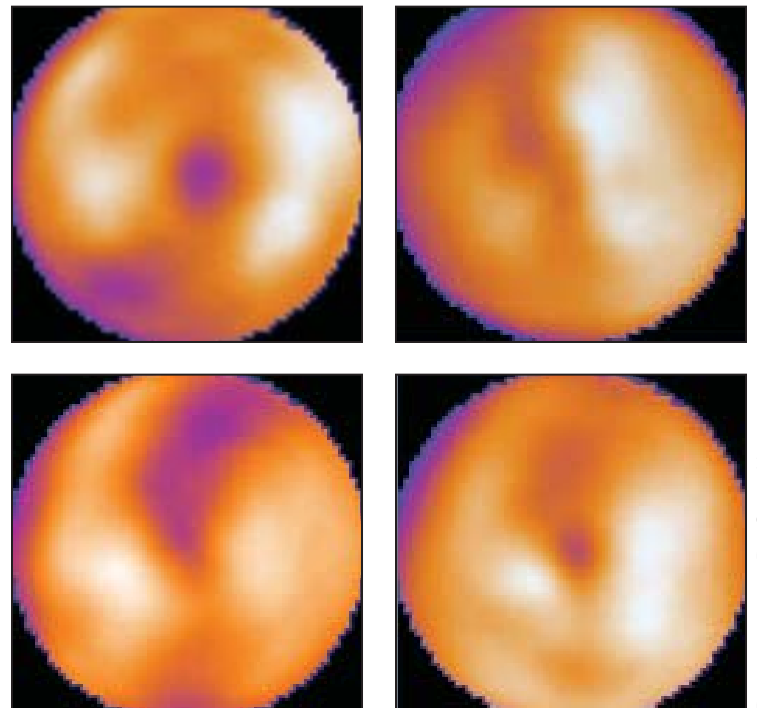
The study included 15 SLE patients and 15 controls who were randomly selected from the center’s patient database, and matched for age (55 years), gender (90% female), and coronary risk factors such as hypercholesterolemia (80%), hypertension (80%), tobacco use (33%), and family history of CAD (80%). All

patients underwent gated SPECT scans, plus either exercise using the Bruce or modified Bruce protocols, or pharmacologic stress testing using dobutamine or adenosine.

Patients with SLE had significantly worse end-systolic volume indices (45 mL/m<sup>2</sup> vs. 32 mL/m<sup>2</sup>), and a trend toward depressed ejection fractions (50% vs. 57%), the authors reported.

Nonsignificant differences also were noted in end-diastolic volume indices (84 mL/m<sup>2</sup> vs. 73 mL/m<sup>2</sup>); summed stress scores (8.9 vs. 4.6); and summed rest scores (6.3 vs. 4.5).

The study was prompted by a case in which gated-SPECT imaging was used to risk-stratify a 35-year-old male who came to the clinic with active lupus and chest pain, and was found to have significant stress and resting perfusion defects and inducible ischemia in the anterior wall. Aggressive treatment for SLE and cardiac risk factors with prednisone, mycophenolate, aspirin, and atorvastatin resulted in sig-



SPECT imaging shows below normal perfusion at rest (top left) and stress-induced ischemia (top right) in an SLE patient with chest pain. SLE and CAD treatment improved resting perfusion (lower left) with no evidence of stress-induced ischemia (lower right).

nificant regression of the ischemia at 1 year. His ejection fraction recovered from 23% to 47%, and stress-induced cavity dilation of the left ventricle improved from 1.68 to 1.25. ■

PHOTOS COURTESY DR. SCOTT YODER

## Underperfusion May Play Role in Poor Exercise Capacity in Diabetics

MONTREAL — Patients with type 2 diabetes had abnormally elevated pulmonary capillary wedge pressure and reduced myocardial perfusion indexes during exercise testing in a small pilot study.

This inverse correlation was present even in the absence of obstructive coronary artery disease or diastolic dysfunction, Dr. Marcus Chen and colleagues reported in a poster at the annual meeting of the American Society of Nuclear Cardiology.

People with type 2 diabetes and no known cardiovascular disease are known to have a reduced ability to exercise, but the mechanism of impairment is not well established. One possibility is that exercise capacity is impaired due to relative cardiac underperfusion, Dr. Chen, a cardiology fellow at the University of Colorado at Denver and Health Sciences Center, said in an interview.

The study included seven women with uncomplicated type 2 diabetes for an average of 3 years, and seven nondiabetic women matched for age (42 years vs. 43 years); weight (body mass index of 28 kg/m<sup>2</sup> vs. 32 kg/m<sup>2</sup>); and physical activity level. All patients underwent resting echocardiograms that were normal, with no evidence of diastolic dysfunction; and myocardial perfusion single-photon computed tomography (SPECT) imaging using a 2-day stress-rest protocol with technetium 99m sestamibi and maximum treadmill exercise.

Myocardial perfusion index (MPI) was determined from stress and rest mean pixel counts in 17 cardiac segments using 4D-SPECT software corrected for dose, decay, and time of imaging. On a separate day, subjects had an internal jugular pulmonary artery

catheter placed, and hemodynamics were continuously monitored during graded bicycle maximal exercise stress testing.

Mean pulmonary capillary wedge pressure (PCWP) rose significantly more steeply and to a greater level with exercise in the diabetic patients than in the controls. At maximal exercise, PCWP was 22.3 mm Hg in those with diabetes, compared with 18.1 mm Hg in controls, the authors reported.

**The findings suggest the presence of cardiac dysfunction during exercise in patients with type 2 diabetes.**

DR. CHEN

Total MPI was normalized to myocardial mass, BMI, and peak exercise double product, it was significantly lower in the diabetes group, compared with controls (11.0 vs. 17.5). Peak exercise double product is a measure of stress workload, derived by multiplying the heart rate by the systolic blood pressure.

The inverse correlation between elevated wedge pressure and decreased normalized MPI was statistically significant. The findings suggest the presence of cardiac dysfunction during exercise in subjects with type 2 diabetes, the authors concluded.

The investigators acknowledged that the study was small and included only women, but reported that women were chosen because it’s been suggested that diabetic women have worse exercise impairments than diabetic men relative to their nondiabetic counterparts. Future studies will expand the cohort, they said. ■



## Arm Pumping Puts Adenosine On Par With Exercise Stress

MONTREAL — Adenosine stress testing with supplemental arm pumping exercise had the same diagnostic accuracy as exercise stress testing in detecting significant coronary artery disease in a study of 302 patients.

The results validate a long-standing practice at Massachusetts General Hospital, Boston, where supplemental arm exercise with light weights—not arm exercise with squeeze balls and not a treadmill walk—has been used to prevent adenosine-related side effects during myocardial perfusion imaging (MPI). Arm-pumping exercise is utilized in all patients who are unable to safely negotiate a treadmill, Dr. Arash Kardan, of the hospital, said in an interview at the annual meeting of the American Society of Nuclear Cardiology.

Supplemental exercise is thought to mitigate adenosine-related bradycardia and hypotension via a neurocirculatory response, he said. “It really works; it’s not just a distraction for the patient.”

The study included 302 patients referred for clinically indicated rest-stress MPI with technetium 99m sestamibi. Patients underwent either exercise stress testing using the standard Bruce protocol

achieving 85% of maximum predicted heart rate, or received an adenosine infusion of 0.14 mg/kg per minute for 4-5 minutes in one arm and pumped a 2.5-pound weight with their opposite arm.

All patients underwent coronary angiography within 2 months of MPI. Positive MPI was defined as showing a reversible defect; positive angiography was defined as the presence of any lesion with greater than 50% stenosis. One-third of patients had prior reported coronary artery disease.

In the 158 patients in the exercise stress group, with a mean age of 63 years, the sensitivity was 91% and specificity 100%, the authors reported.

In the 144 patients in the arm exercise group, with a mean age of 68 years, sensitivity was 84% and specificity 81%. The differences from the exercise stress group were nonsignificant. No adenosine arm tests required termination because of side effects. All exercise treadmill tests were completed as well, he said.

The hospital has performed more than 10,000 adenosine tests using the arm-pumping exercises, and less than 1% of tests have been terminated, said Dr. Kardan. ■