Diabetes

Stress Perfusion Nuclear Imaging in Diabetes

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[*Rev Cardiovasc Med. 2002;*3(3):164–165]

The Impact of Diabetes on the Risk Stratification Using Stress Single-Photon Emission Computed Tomography Myocardial Perfusion Imaging in Patients with Symptoms Suggestive of Coronary Artery Disease

Giri S, Shaw LJ, Murthy DR, et al.
Circulation. 2002;105:32–40.

The article by Giri and coworkers evaluates the outcome of diabetic and nondiabetic patients following stress perfusion nuclear imaging. This study included a large enough number of subjects to make definitive statements as to how diabetes affects event rates stratified according to the magnitude of abnormalities on nuclear imaging. In the past, most of the key studies establishing the predictive power of noninvasive testing for coronary heart disease (CHD) did not discriminate between the presence or absence of diabetes. Clinicians, therefore, have used the information from stress testing rather blindly, assuming that diabetic patients and nondiabetic patients did not differ. We now fully appreciate, however, that the natural history and biology of coronary heart disease are greatly affected by the presence of diabetes.

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Patients with angina were prospectively recruited, underwent stress perfusion imaging with assessment of the number of ischemic and fixed defects, and were followed for 2.5 years. Outcomes of cardiac death, myocardial infarction, percutaneous coronary intervention, and coronary artery bypass graft are shown in Figure 1. Of major interest was the observation that a normal scan did not predict similar survival rates for the two groups. The survival curves separated soon enough after the scan that the investigators recommended that adequate monitoring of coronary risk in diabetic patients might require scans at regular intervals of less than 2 years (Figure 2). In addition, diabetes approximately doubled the risk for cardiac death at each level of scan abnormality measured. For example, for nondiabetic subjects with one ischemic defect, the death rate was 1.9% over 2.5 years, whereas for diabetic subjects, the rate was 5.6%. When adjusted for clinical factors and the degree of perfusion abnormalities, the Cox regression survival plots were similar for the two groups.

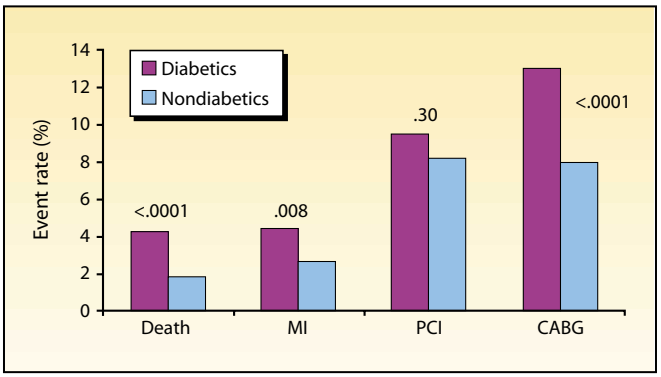
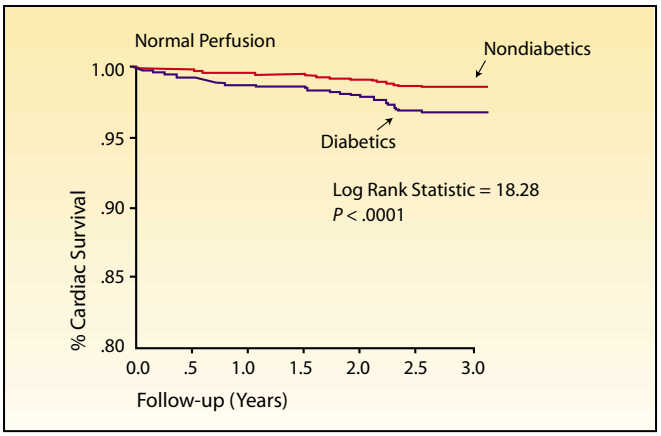


Figure 1. *Outcomes of cardiac death, myocardial infarction (MI), percutaneous coronary intervention (PCI), and coronary artery bypass graft (CABG) in diabetic and nondiabetic patients. Reproduced, with permission from the publisher, from Giri S, Shaw LJ, Murthy DR, et al. The impact of diabetes on the risk stratification using stress single-photon emission computed tomography myocardial perfusion imaging in patients with symptoms suggestive of coronary artery disease.* Circulation. *2002;105:32–40.*

Figure 2. *Kaplan-Meier survival curves comparing the subset of diabetic and nondiabetic patients with normal stress myocardial perfusion imaging. Reproduced, with permission from the publisher, from Giri S, Shaw LJ, Murthy DR, et al. The impact of diabetes on the risk stratification using stress single-photon emission computed tomography myocardial perfusion imaging in patients with symptoms suggestive of coronary artery disease.* Circulation. *2002;105:32–40.*



How should this information be used in practice? It appears that a positive scan of any magnitude in the presence of diabetes defines "high risk." Whether or not coronary angiography should be performed on this basis alone, regardless of the magnitude of the scan abnormalities, in all diabetic patients is controversial due to cost and risk. In addition, the relative efficacy of medical treatment, percutaneous intervention, and coronary bypass surgery in these patients has yet to be defined and is currently being investigated in clinical trials such as COURAGE and BARI-2D. Furthermore, data from the study by Giri and coworkers evaluated only symptomatic individuals and may not apply to asymptomatic patients being screened for coronary disease with stress perfusion imaging. ■

Congestive Heart Failure

Cardiac Resynchronization Therapy for Congestive Heart Failure

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There has been much recent interest in a new form of nonpharmacologic therapy to treat patients with congestive heart failure. This treatment, cardiac resynchronization, involves left ventricular or biventricular pacing that utilizes a specialized pacing lead introduced through the coronary sinus that is positioned onto the lateral wall of the left ventricle. Pacing of the right ventricle employs a standard endocardial lead. Using an atrial sensing lead, pacing of the ventricles is given in a synchronized manner to coordinate ventricular contractility. This form of therapy has reduced symptoms of congestive heart failure in patients with marked left ventricular dysfunction who also have a wide QRS complex during sinus rhythm. Most patients enrolled have had some form of left bundle branch block conduction delay. A timely review of cardiac resynchronization has been published by Leclercq and Kass.[1] Two new observations on cardiac resynchronization have recently been published.

Impact of Cardiac Resynchronization Therapy Using Hemodynamically Optimized Pacing on Left Ventricular Remodeling in Patients with Congestive Heart Failure and Ventricular Conduction Disturbances

Stellbrink C, Breithardt O-A, Franke A, et al.
J Am Coll Cardiol. 2001:38:1957–1965.

Stellbrink and colleagues studied the effects of 6 months of cardiac resynchronization therapy on left ventricular function using echocardiographic markers. Twenty-five patients with New York Heart Association (NYHA) functional Class III or IV heart failure were included. Ischemic heart disease was present in 7 patients and idiopathic dilated cardiomyopathy in 18 patients. Conduction delay by electrocardiographic criteria was classified as left bundle branch block in 21 (84%) patients, right bundle branch block in 1 (4%), and 3 (12%) patients had intraventricular conduction delay.

Cardiac resynchronization therapy has reduced symptoms of congestive heart failure in patients with marked left ventricular dysfunction who also have a wide QRS complex during sinus rhythm.

After 6 months of resynchronization therapy, NYHA functional Class improved from a baseline value of 3.0 ± 0.1 to 1.9 ± 0.7. Echocardiographic data demonstrated that left ventricular end diastolic diameter was significantly reduced from 71 ± 10 to 68 ± 11 mm (P = .027). Further, left ventricular end systolic diameter decreased from 63 ± 11 to 58 ± 11 mm (P = .007). Both left ventricular end diastolic and end systolic volumes diminished. The authors concluded that cardiac resynchronization therapy may lead to a reduction in left ventricular volumes in patients with substantial congestive heart failure who also have conduction disturbances.

Long-Term Left Ventricular Pacing: Assessment and Comparison with Biventricular Pacing in Patients with Severe Congestive Heart Failure

Touiza A, Etienne Y, Gilard M, et al.
J Am Coll Cardiol. 2001:38:1966–1970.

Touiza and colleagues evaluated cardiac resynchronization treatment in 33 patients with advanced congestive heart failure. In particular, they compared the effects of left