Screening for Coronary Artery Disease in Asymptomatic Diabetic Patients

a report by
Joanne D Schuijf, Jeroen J Bax and Ernst E van der Wall

Department of Cardiology, Leiden University Medical Centre, Leiden, The Netherlands

Diabetes is an important risk factor for coronary artery disease (CAD) as reflected by the four-fold greater incidence of CAD in diabetic patients compared with the general population.1 Cardiovascular death is the most common cause of mortality in the type 2 diabetic population and, once diagnosed with CAD, patients with diabetes have a considerably poorer prognosis than their non-diabetic counterparts. Accordingly, early detection of CAD in patients with diabetes may be of paramount importance and could improve outcome substantially. However, a complicating issue is the slow progression of CAD in patients with diabetes. Consequently, the disease is frequently already in an advanced state when it becomes clinically manifest.2 In addition, recent studies have indicated that conventional coronary risk factors are of limited value for detection of CAD in asymptomatic type 2 diabetes patients.3,4 These observations have raised the question of whether or not asymptomatic patients with diabetes should be screened for CAD.

Issues in Screening
To determine whether or not it is appropriate to screen asymptomatic individuals, several questions should be addressed. First, the prevalence of CAD in the population should be high enough to justify testing for the disease. A relatively low prevalence will result in a relatively high percentage of false-positive test results, leading to unnecessary further testing. On the other hand, if the prevalence is too high, testing will not be effective and will result in a high number of false-negative results. Second, the proposed test should have sufficient accuracy and should allow accurate distinction between low-risk and high-risk patients. In addition, the proposed screening strategy should be cost-effective. Finally, the test results should have consequences for individual patient management and should lead to improved outcome.

The Prevalence of Coronary Artery Disease
To date, data on the prevalence of CAD in patients with diabetes are still limited and only a small number of studies have prospectively addressed this clinical question. Recently, results from the Detection of Silent Myocardial Ischaemia in Asymptomatic Diabetics (DIAD) study were published.6 In this study by Wackers et al., the prevalence of silent ischaemia was evaluated in 522 asymptomatic patients with two or more risk factors, using gated technetium-99m sestamibi single photon emission computed tomography (SPECT) imaging. The authors noted a relatively high percentage (22%) of abnormal myocardial perfusion studies. Moreover, in 40% of patients with abnormal SPECT, the perfusion defect involved more than 5% of the left ventricular myocardial tissue. The fact that conventional risk factor assessment was not predictive of abnormalities during SPECT imaging was of particular interest. Zellweger et al. studied 1,737 patients with diabetes, of whom 826 were asymptomatic – a prevalence of 39% abnormal SPECT studies was observed.5 Considerably higher values of abnormal studies were reported by Sconamiglio and colleagues, who evaluated myocardial perfusion with myocardial contrast echocardiography in 1,899 asymptomatic diabetic patients.3 Overall, the prevalence of abnormal studies was 60%, and this percentage was comparable between patients with or without three or more risk factors. Thus, the current literature shows a wide variation in the prevalence of silent ischaemia, which could be (partially) attributed to differences in patient characteristics, study design and inclusion criteria.

Identification of Low-risk and High-risk Patients
Another question that needs to be addressed is whether the screening test allows accurate distinction between low-risk and high-risk patients. So far, only a few studies have evaluated the prognostication of asymptomatic diabetic patients. Rajagopalan et al. demonstrated an annual hard event rate of 5.9% for patients with an abnormal SPECT image versus 1.6% for those with a normal image. Similar findings were reported by Zellweger et al., who studied patients with angina, patients with dyspnea and asymptomatic patients. An annual hard event rate of 5.4% was observed for an abnormal study, although a normal test was still associated with an event rate of 1.9%. Interestingly, no differences were observed between asymptomatic patients and patients with angina. Finally, in a smaller study in 180 asymptomatic diabetic patients, annual hard event rates of 9% and 2% were observed for abnormal and normal studies, respectively. In contrast to data in the general population (showing event rates <1% in patients with normal SPECT images), relatively high event rates are also observed in diabetic patients with normal test results, indicating a need for further refinement.

Cost-effectiveness – Sequential Imaging?
At present no data are available on the cost-effectiveness of screening in patients with diabetes. However, it is unlikely that evaluating all diabetics...
studies that revascularisation was independently associated with
observed in 261 asymptomatic diabetic patients with high-risk SPECT
diabetes, hard evidence is currently lacking. Preliminary data in small
ischaemic therapy should also be attractive in asymptomatic patients with
data from the general population suggest that revascularisation or anti-
Improved Outcome

**Improved Outcome**

Finally, the screening algorithm should result in the alteration of individual treatment strategies and lead to improved outcome. Although data from the general population suggest that revascularisation or anti-

**Summary**

A growing need exists to establish a clinical strategy for the cardiac evaluation and management of asymptomatic patients with diabetes. Although results from individual studies show a wide variation in exact numbers, the currently available data do suggest a significant prevalence of undiagnosed CAD in this population, which may warrant screening. To this purpose, sequential imaging of atherosclerosis and ischaemia could be a promising strategy. However, both safety and cost-effectiveness remain to be further evaluated. Whether screening and early detection of disease ultimately result in improved outcome has not yet been established.

EUROECHO 2007

The Eleventh Annual Meeting of the European Association of Echocardiography, a Registered Branch of the ESC, in cooperation with the Working Group on Echocardiography of the Portuguese Society of Cardiology

Portugal

Lisbon

5-8 DECEMBER 2007

Important Deadlines:

Abstract Submission
30 May 2007

Early Fee Registration
3 October 2007

Late Fee Registration
7 November 2007

www.euroecho.org