

## Stress imaging in patients with diabetes; routine practice?

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Over the past years, echocardiography has been shown to play a crucial role in the accurate evaluation of left ventricular function particularly in patients suspected for ischemic heart disease [1–3]. The ability to rapidly perform bedside echocardiography with Echo-Doppler imaging places this modality in the heart of clinical research to understand cardiac function and to quantify various associated abnormalities [4–8]. Echocardiography has found a major niche in visualizing left ventricular function both at rest and during stress. Widespread use of dobutamine-echocardiography has contributed to more frequent recognition of wall motion disturbances due to coronary artery disease [9–11]. Its applicability in prognostic assessment of such patients has been repeatedly confirmed, particularly in diabetic subjects [12]. Coronary artery disease is the leading cause of morbidity and mortality in patients with diabetes mellitus. In fact, patients with diabetes have the same risk of myocardial infarction as do non-diabetic subjects with a history of infarction. Present data indicate a substantially elevated risk of cardiovascular

disease even before a clinical diagnosis of type-2 diabetes has been made. Identifying patients with diabetes suspected for coronary artery disease who will benefit from medical and/or invasive intervention to prevent cardiovascular events is a challenge in both symptomatic and asymptomatic patients. The decision to evaluate patients with diabetes who are asymptomatic for coronary artery disease presents the greatest challenge; investigation will reveal 10–15% of these patients to have coronary artery disease. Current diagnostic tools include exercise tolerance testing [13–18], stress myocardial perfusion imaging [19–26], stress MRI [27–57], and stress echocardiography [12].

In the current issue of the *International Journal of Cardiovascular Imaging*, Innocenti et al. [58] studied 322 type-2 diabetic patients who underwent dobutamine-stress echocardiography for known or suspected coronary artery disease. Indications to dobutamine-stress echocardiography were evaluation of symptoms suggesting presence of coronary artery disease or assessment of known coronary artery disease. End-points of the study were all-cause mortality, cardiac death, and non-fatal myocardial infarction. During dobutamine-stress echocardiography, viability and inducible ischemia developed in 65 (20%) and 192 (60%) subjects, respectively. Severe ischemia (defined as an asynergic area including more than 40% of all segments combined with a rate pressure product <17000) appeared in 88 (27%) of patients. Presence of diabetic treatment or microvascular

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diabetic complications did not affect prognosis, while longer diabetes duration was associated with higher all-cause mortality at univariate analysis. At multivariate analysis, advanced age, decreased left ventricular ejection fraction, and peripheral vascular disease independently determined increased all-cause mortality. New hard cardiac events occurred more frequently in presence of peripheral vascular disease, viability and severe ischemia. The authors concluded that in diabetic patients with known or suspected coronary artery disease, presence of viability and severe ischemia during dobutamine-stress echocardiography are independently associated with a higher occurrence of hard cardiac events. The clinical variables showed a weak prognostic role, except for age and presence of peripheral vascular disease. These findings emphasize the role of stress echocardiography in patients with type-2 diabetes.

It should, however, be realized, that the value of stress imaging in diabetic patients is dependent on the presence and nature of symptoms. In symptomatic patients, myocardial perfusion imaging provides similar diagnostic and prognostic accuracies as in patients without diabetes [59]. However, the utility of screening patients with type-2 diabetes for asymptomatic coronary artery disease remains controversial [60–62]. For instance, the Detection of Ischemia in Asymptomatic Diabetics (DIAD) study [62] assessed whether routine screening for coronary artery disease identified patients with type-2 diabetes as being at high cardiac risk and whether it affects their cardiac outcomes. A total of 1123 participants with type-2 diabetes and no symptoms of coronary artery disease were randomly assigned to be screened with adenosine-stress radionuclide myocardial perfusion imaging or no screening. It was found that in patients with diabetes, the cardiac event rates were low and were not significantly reduced by screening for myocardial ischemia over almost 5 years. Therefore, findings from the DIAD study indicate that routine screening of asymptomatic patients with diabetes is not justified.

Notwithstanding, the current study [58] shows that dobutamine-stress echocardiography has a major role in the evaluation of diabetic patients. In symptomatic diabetic patients with known or suspected coronary artery disease, advanced age and reduced left ventricular function are independent predictors of total mortality. Presence of viability and severe ischemia

during dobutamine-stress echocardiography are independently associated with higher occurrence of new major cardiac events. Therefore, dobutamine-stress echocardiography is an important prognostic imaging modality in assessing cardiovascular risk in symptomatic diabetic patients.

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