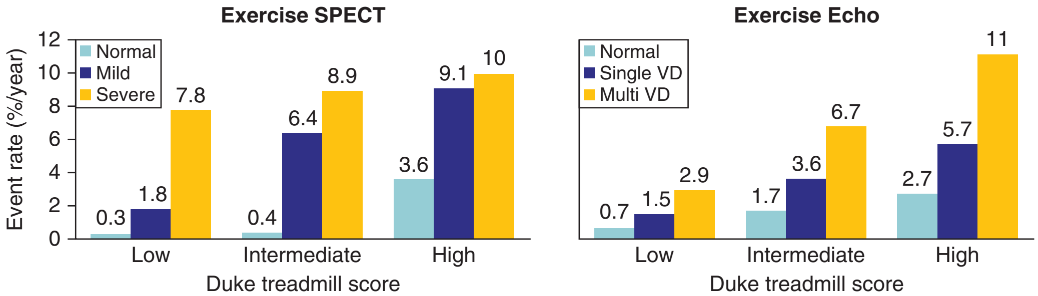


**FIGURE 270e-15 Incremental risk stratification of stress imaging over Duke treadmill score in patients with suspected coronary artery disease.** Stress imaging is most valuable in the intermediate-risk group. SPECT, single-photon emission computed tomography; VD, vessel disease. *(Reproduced with permission from R Hachamovitch et al: Circulation 93:905, 1996; and TH Marwick et al: Circulation 103:2566, 2001.)*

events, defined as CAD death or hospitalization for an acute coronary syndrome or heart failure. At 2 years, there was no difference in major adverse cardiac events. As expected, ETT resulted in 48% lower costs compared to exercise radionuclide imaging.

Patients with intermediate-high risk after ETT (e.g., low exercise duration, chest pain, and/or ST-segment depression without high-risk features) will often require additional testing, either stress imaging or noninvasive CT coronary angiography, to more accurately characterize clinical risk. Most common stress imaging strategies in intermediate-risk patients include stress echocardiography and radionuclide imaging. In such patients, stress imaging with either SPECT or echocardiography has been shown to accurately reclassify patients who are initially classified as intermediate risk by ETT as low or high risk (Fig. 270e-15). Following this staged strategy of applying the low-cost ETT first and reserving more expensive imaging to refine risk stratification to patients initially classified as intermediate risk by ETT is more cost effective than applying stress or anatomic imaging as the initial test routinely.

A stress imaging strategy is the recommended first step for patients who are unable to exercise to an adequate workload and/or those with abnormal resting ECGs (e.g., left ventricular hypertrophy with strain, left bundle branch block). Importantly, the most recent documents regarding appropriate use of radionuclide and echocardiography imaging also considered that an imaging strategy may be an appropriate first step in patients with intermediate-high likelihood of CAD (e.g., diabetics, renal impairment) due to increased overall sensitivity for diagnosis of CAD and improved risk stratification.

In considering the potential clinical application of imaging modalities, the evidence supporting the role of assessment of ischemia versus anatomy must be considered. From the discussion above, a normal CTA is helpful because it effectively excludes the presence of obstructive CAD and the need for further testing, defines a low clinical risk, and makes management decisions regarding referral to coronary angiography straightforward. Because of its limited accuracy to define stenosis severity and predict ischemia, however, abnormal CTA results are more problematic to interpret and to use as the basis for defining the potential need of invasive coronary angiography and revascularization. In such patients, a follow-up stress test is usually required to determine the possible need of revascularization (Fig. 270e-16).

The justification of stress imaging in testing strategies has hinged on the identification of which patients may benefit from a revascularization strategy by means of noninvasive estimates of jeopardized myocardium rather than angiography-derived anatomic stenoses. Indeed, there is evidence that only the presence of moderate-severe ischemia identifies patients with apparent improved survival with revascularization. Patients with mild or no ischemia are better candidates for optimal medical therapy. The advantages of this approach include avoidance of excess catheterizations with their associated cost and risk and the potential for intervening unnecessarily. The acceptable diagnostic accuracy of stress imaging approaches, along with their robust risk stratification, and the ability of ischemia information to identify patients who would benefit from revascularization suggest a potential role as a first imaging strategy in patients with intermediate-high likelihood of CAD. Although the available data suggest similar diagnostic accuracy for SPECT, PET, echocardiography, and CMR, the choice of strategy depends on availability and local expertise.

**Selecting a Testing Strategy in Patients with Known CAD** Use and selection of testing strategies in symptomatic patients with established CAD (i.e., prior angiography, prior myocardial infarction, prior revascularization) differ from those in patients without prior CAD. Although standard

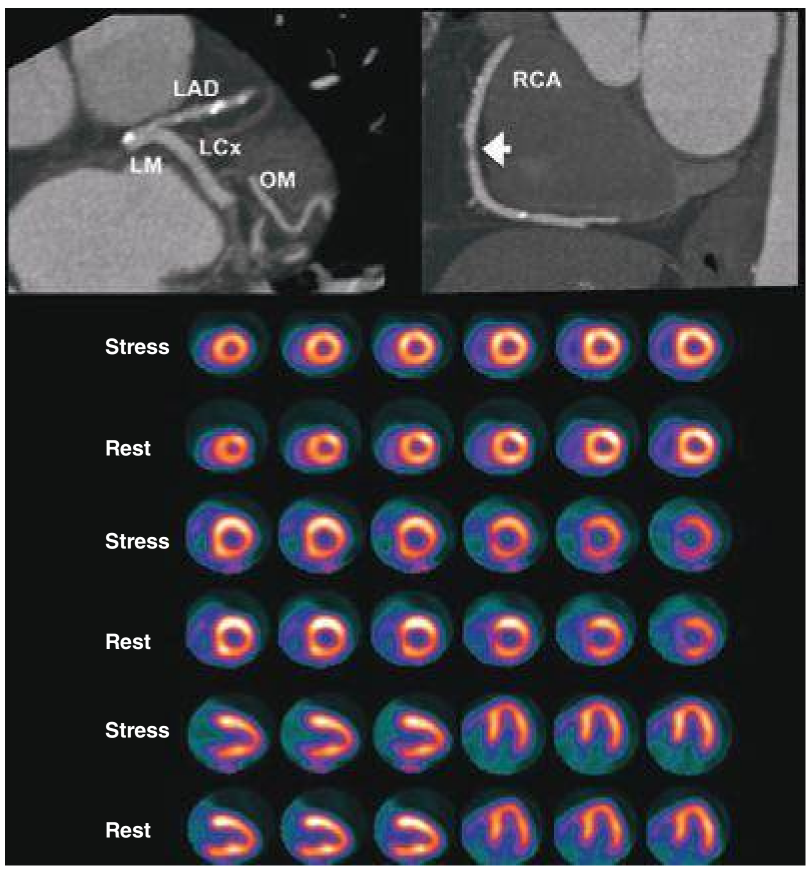


**FIGURE 270e-16 Selected views from coronary computed tomography angiographic (CTA) images (*top panel*) and stress and rest rubidium-82 myocardial perfusion positron emission tomography images (*lower panel*) obtained on a 64-year-old male patient with atypical angina.** The CTA images demonstrate dense focal calcifications in the left main (LM) and left anterior descending (LAD) coronary arteries and a significant noncalcified plaque in the mid right coronary artery (RCA; *arrow*). The myocardial perfusion images demonstrated no evidence of flow-limiting stenosis. LCx, left circumflex artery; OM, obtuse marginal branch.