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Drugs and exercise testing

Consider the reason for the test

"Should I take my tablets before the test?"—a common question, but what should be the response in the context of exercise testing and coronary artery disease? Many drugs may substantially affect a patient's exercise capacity, and anti-anginal drugs in particular may influence many end points assessed during exercise testing. Despite this no consensus exists on whether exercise testing should be performed in the presence or absence of drugs.^{1,2}

Several studies have confirmed the exercise test as a valuable tool in the assessment and prognosis of coronary stenosis.³ Although antianginal treatment increases exercise tolerance and decreases symptoms, few data exist on whether it modifies the risk of myocardial infarction in patients with chronic stable angina. The importance of "silent ischaemia" is much debated, but exercise induced ST changes without symptoms are no longer considered to be grounds for therapeutic complacency.⁴ It could be argued that all patients should be exercised first off drugs to objectively assess symptoms and risk and then again when they are symptomatically stable on drugs. Patients should then be referred for further investigation on the basis of the first exercise test, with the urgency of referral being based on the second test.

The original studies of the prospective value of exercise testing in chronic stable angina did not exclude patients treated with β blockers; the results were valid irrespective of β blocker use. β Blockers reduce mortality after myocardial infarction, but the use of exercise testing to establish prognosis after myocardial infarction was investigated largely in the absence of β blockade. Such treatment might be expected to increase the sensitivity of exercise testing (the probability of a positive test result in those patients with a positive diagnosis) but to decrease its specificity (the probability of a negative test result in those patients with a negative diagnosis). Furthermore, the prognostic implication of a positive exercise test result rendered negative by drug treatment is unknown,⁵ although better short term outcome was noted in a preliminary study of patients in whom these changes were found on exercise radionuclide ventriculography.⁸

In exercise tests used to investigate chest pain the diagnostic yield will be greatest without the confounding effects of antianginal drugs, which should be stopped at least five half lives before the test. For patients presenting with angina who are already taking drugs a baseline test during treatment will go some way toward identifying those at highest risk, while repeating the test off treatment in those who originally tested negative may establish the usefulness of the electrocardiographic aspect of the exercise test in further follow up. Testing the response to specific treatments (for example, angioplasty) should be performed under stable therapeutic conditions. Exercise testing to establish prognosis after myocardial infarction is best undertaken in the absence of calcium antagonists and nitrates. Whether β blockade alters the prognostic reliability of a negative result remains unknown, and long term trials are needed.⁹

The withdrawal of drugs causes much concern. If patients experience frequent exertional angina then an exercise test is unlikely to yield further diagnostic information. These patients require further investigation, the urgency of which may be assessed by an exercise test on drugs if the angina is infrequent. Antihypertensive drugs complicate the situation because of their antianginal effects—a positive test result on drugs provides useful information, but a negative result does not, particularly if accompanied by repolarisation abnormalities in the resting electrocardiogram. Other drugs, including digoxin, flecainide, and amiodarone, may interfere with the electrocardiographic interpretation of an exercise test (particularly the lateral ST segments, which are notoriously labile in the presence of digoxin).¹⁰ "Therapeutic difficulty" should be considered an indication for early catheterisation.

Regardless of the problems caused by antianginal drugs in interpreting results of exercise tests, the limitations of these tests in coronary artery disease in general should not be forgotten. Even in patients with clinically important disease up to one in five tests may yield negative results. Exercise testing identifies fixed high grade stenoses, but the risk of infarction is also a function of the number of stenoses, regardless of severity. In common with coronary angiography, exercise testing produces little information about the stability of atheromatous plaque: substantial numbers of patients develop coronary thrombosis with stenosis of less than 50%.

Exercise tests should be requested and interpreted in the light of these limitations if scarce resources are to be used most effectively.

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