Misleading Exercise Tolerance Test Results

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The current report documents the case of a 29-year-old sportsman who presented to our heart center with palpitation for evaluation with the exercise tolerance test (ETT). He had no risk factors and no known history of ischemic heart disease, cardiomyopathy, arrhythmia, or central nervous system disease. He had normal echocardiographic findings. The pretest probability for ischemic heart disease was low, but his test result was positive with a 1.5-mm ST segment depression in the lateral leads (V3-6) in stage III of the ETT. Consequently, the patient underwent coronary CT-angiography one day later, which showed that he had normal coronary arteries.

According to previous studies, the importance of an exercise test is its predictive value, the probability of developing disease over a given time. In turn, the predictive value of the test is related to the prevalence of the disease in the population being studied. Clearly, the predictive value of an abnormal test is high in groups with a high prevalence of coronary heart disease. Conversely, in populations where the prevalence of disease is low, the predictive value of a normal test is high. Also prescription of safe exercise is best determined from an objective measure of aerobic capacity, including online observations of oxygen consumption, respiratory exchange ratio, heart rate, electrocardiograms, blood pressure, and perceived exertion, during the exercise test (1-3).

Of course most people who yield slightly abnormal results on ETT with moderate or high levels of exertion do not need to undergo coronary angiography. Serial testing from good baseline data increases sensitivity too. Patients with striking degrees of ST-segment shift on the ETT should certainly be considered for coronary angiography (3-4).

We agree that 1 mm or more of ST depression should be the usual criterion of a positive test. But an exercise test cannot and should not be interpreted in isolation. ST-segment depression is nothing more than a functional expression of an abnormal metabolic supply to the myocardial cell, of which there are many causes. A particular cause of ST depression that must be considered is excessive hemodynamic stress related to normal coronary supply in maximal testing in asymptomatic athletic men. Sound clinical conclusions require the use of all available clinical, physiological, and epidemiological information and an extensive knowledge of risk factors and the clinical state of the patient being tested (3-4). ***(Iranian Heart Journal 2012; 13(3):54-55) .***

Received December 2012 ; Accepted for publication December 2012

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References

1. Douard H, Courregelongue M, Broustet JP, Roudaut R. Exercise test in athletes. Arch Mal Coeur Vaiss. 2006 Nov;99(11):975-81

2. Pigozzi F, Spataro A, Alabiso A, Parisi A, Rizzo M, Fagnani F, Di Salvo V, Massazza G, Maffulli N. Role of exercise stress test in master athletes. Br J Sports Med. 2005 Aug;39(8):527-31.

3. Malek S, Smiri Z, Hajlaoui N, Abdesselem S, Barakett N, Rahal N, Mhenni H, Haouala H, Guediche M. Predictive factors of normal coronary angiography. Tunis Med. 2001 Nov;79(11):609-12.

4. Hauser TH, Dorbala S, Sulaiman A, Di Carli MF. Quantitative relation of ST-segment depression during exercise to the magnitude of myocardial ischemia as assessed by single-photon emission computed tomographic myocardial perfusion imaging. Am J Cardiol. 2004 Sep 15;94(6):703-8.