Case Report

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Negative Treadmill Exercise Test does not Rule out Coronary Artery Disease

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Abstract

Myocardial Infarction rarely occurs in a patient with a recent normal Treadmill Test [1]. The case presented in this study describes a 54 year old male Indian who presented with an acute myocardial infarction in spite of having a normal treadmill test, normal electrocardiogram and relevant blood tests. The conclusion drawn from this study is that treadmill tests though very important for cardiological evaluation, a negative test does not rule out an underlying Coronary Artery Disease.

Keywords: Myocardial Infarction; Electrocardiogram; Coronary Artery Disease.

Case Report

A 54 year male Indian was admitted for severe retrosternal chest pain for 3 hours associated with profuse sweating and shortness of breath. He had been in good health. For the past two weeks he started having retrosternal chest pain on and off and shortness of breath mainly during meals. He consulted his personal physician after seven days and underwent ECG, lipid profile, cardiac enzymes, Echocardiography and Chest X ray. The results were within normal limits and TMT (which was done 24 hrs prior to myocardial infarction) was negative. The maximum work load achieved was 10.2 minutes, maximum heart rate achieved was 86% and RPP was 18330. The treadmill test report was further confirmed by four cardiologists to be negative for provocable ischemia. Echocardiography did not show any regional wall motion abnormality with a Left Ventricular ejection fraction of 65% with reduced diastolic compliance and good left ventricular systolic function. ECG and Chest x-ray were also within normal limits. Patient was non diabetic and non hypertensive. He was a cigarette smoker for the past 30 years, smoking about 30 per day. There was no family history of cardiovascular disorders. Clinical examination at that time revealed a properly nourished male with a blood pressure of 140/80. Lungs were bilaterally clear with vesicular

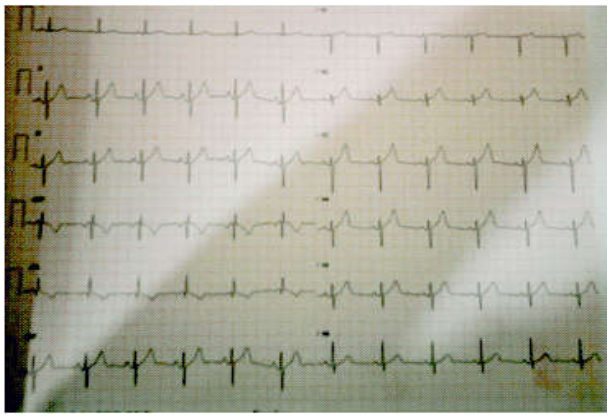

Image 1: ECG before admission

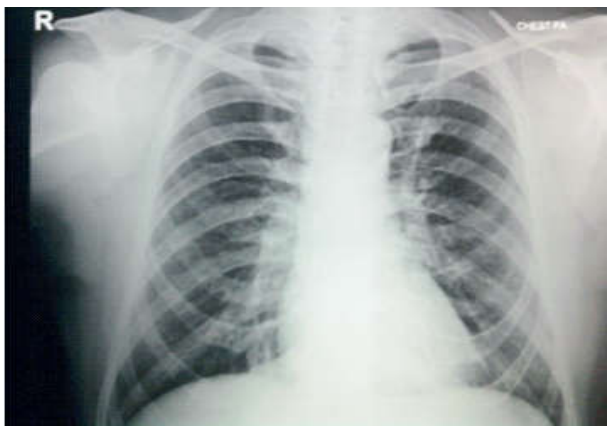

Image 2: Chest X Ray before admission

breath sounds and trachea centrally positioned. JVP was not raised. S1 and S2 were audible with no added sounds. Rest of the exam was unremarkable.

On the evening after admission he was diagnosed with acute myocardial infarction with ST elevation accompanied with T wave inversion in leads V1 to V6 in the ECG. The CPK was 3200 IU and CPKmb 593 IU.

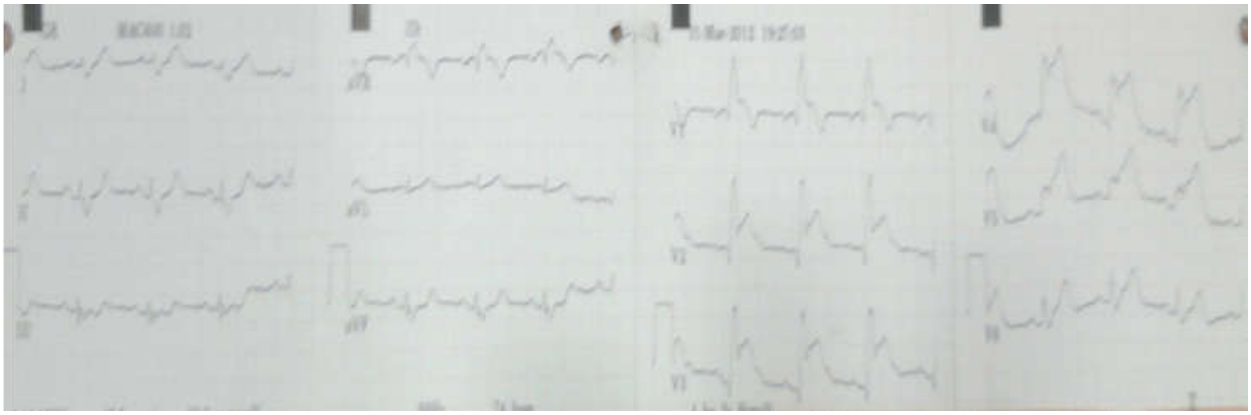

Image 3: ECG after admission

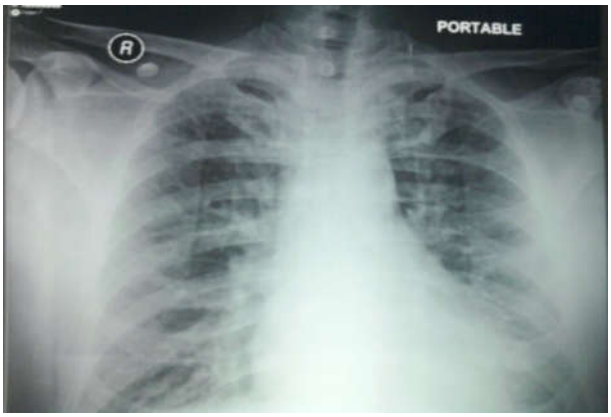

Image 4: Chest X Ray after admission

He was thrombolysed with tenecteplase 40 IU. Echocardiography revealed dilated left ventricular cavity with akinetic anterior and septal wall. No pericardial effusion was noted.

The next morning ECG showed partial resolution of ST segments in V5 and V6. He was put up for coronary angiography which revealed 90% obstruction in Left anterior descending artery, 45% obstruction in left main descending artery, and 60% obstruction in Right Coronary artery. The patient tolerated the procedure and no complications were recorded.

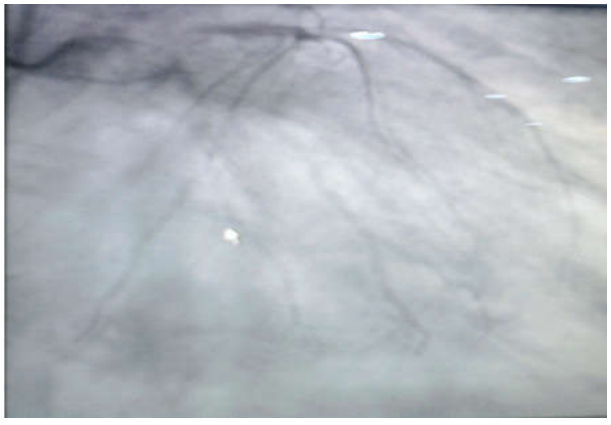

Image V: Patients coronary angiography

Discussion

Exercise testing is of immense value if the test turns out to be positive. But a negative test does not rule out coronary artery disease [1].

A study by Daniel B Mark et all in April 2012 studied 2842 consecutive patients having chest pain who had undergone both Treadmill testing and cardiac catheterization. The study concluded that treadmill score was useful in classifying the patients with suspected coronary Artery Disease [2]. The study demonstrated those with a treadmill score of +7 had a five year survival rate of 93%. Another study done by Jeffery S Borer et al concluded that the diagnostic usefulness of exercise testing is limited. False negative reports with clinically suspected coronary artery disease are frequent [3]. Walker J. et all concluded in a study that due to inadequate sensitivity non invasive cardiac stress tests should not be used to rule out Coronary artery Disease.74.4% patients had negative stress test prior to index admission [4]. The sensitivity of treadmill testing according to the modified Bruce protocol is 73%-90% and specificity is 50%- 74% [5]. Sensitivity of a screening test is the ability to correctly identify diseased persons from among those that are diseased [9]. In this particular patient multiphase screening could not identify the problem. Hence the

test results may be termed as false negatives. A positive treadmill test in a patient having suspected coronary artery disease is invariably of immense value. However a negative stress test does not rule out a coronary artery disease. In our patient the negative stress test as well as apparently normal investigation reports could not predict an upcoming cardiac event.

Conclusion

Though a positive treadmill test definitely indicates a coronary artery disease a negative treadmill test does not rule out Coronary Artery Disease. The possibilities might be that the patient might have been having intermittent coronary spasm. Our patient being a smoker also might be having soft plaque coronary atherosclerosis or he might even had a non- occlusive

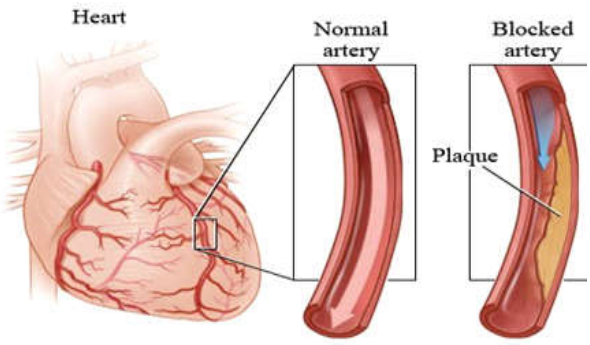

Image 6: Soft plaque coronary atherosclerosis

Plaque obstructing the coronaries which might have resulted in occlusion during an episode of vasospasm. This case report might change the thinking pattern of the Emergency physicians. Though we know the sensitivity and specificity of a Treadmill test still it should be emphasized among the physicians that even when a person presents with symptoms related to ACS with a negative treadmill test as recent as on the same day one should not be fooled by it. Clinical examination and clinical hunch is superior to tests.

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