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Case Report: When Exercise Went Wrong

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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Case Study

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ABSTRACT

Background: Exercise stress test (EST) is recommended as the first-line investigation in major guidelines. It believed as a safe procedure. However, there is unignorable complications include hospitalisation, acute myocardial infarction and sudden cardiac death.

Case Presentation: We describe a case of a 56-year-old male who underwent exercise stress test and complicated with hemodynamically unstable ventricular tachycardia. He was resuscitated and diagnosed with acute anterior ST-elevation myocardial infarction. Subsequent coronary angiogram showed severe two vessels disease.

Conclusion: This illustrates the importance to identify a cohort of high-risk patient pre-EST, along with proper supervision and well-staffed exercise stress test lab in order to provide appropriate lifesaving treatment.

Keywords: Exercise stress test; ventricular tachycardia; myocardial infarction; complication during exercise stress test.

1. INTRODUCTION

Exercise stress test (EST) is widely available and remained as a useful first-line investigation in evaluating chest pain for diagnostic and disease

prognostication [1]. The sensitivity and specificity of EST reported around 45–50% and 85–90% [2]. Generally, EST is a safe procedure; however, the estimated risk of complications such as hospitalisation, acute myocardial infarction, or

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sudden cardiac death during or immediately after an EST are $\leq 0.2\%$, 0.04% and 0.01% , respectively [3].

2. CASE DESCRIPTION

We are reporting a case of life-threatening complication during EST. A 56-year-old chronic

smoker male presented to a district hospital with chronic stable angina then underwent EST at a tertiary centre. His resting electrocardiogram (ECG) showed Q wave at the anterior lead with T wave inversion over lateral lead (Fig. 1a). During Stage II modified Bruce protocol EST, he complained of palpitation and chest heaviness. Unfortunately, directly after, he collapsed and

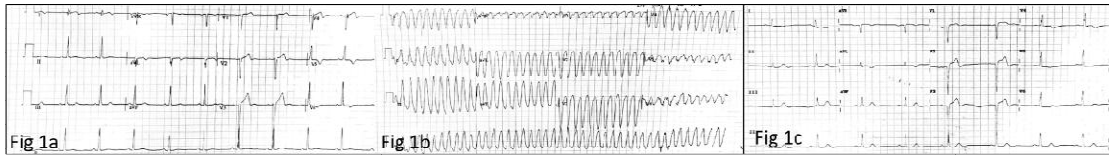


Fig. 1(a). Pre exercise stress test electrocardiogram; (b). Electrocardiogram during ventricular tachycardia; (c). Electrocardiogram after exercise stress test showing anterior acute ST elevation myocardial infarction

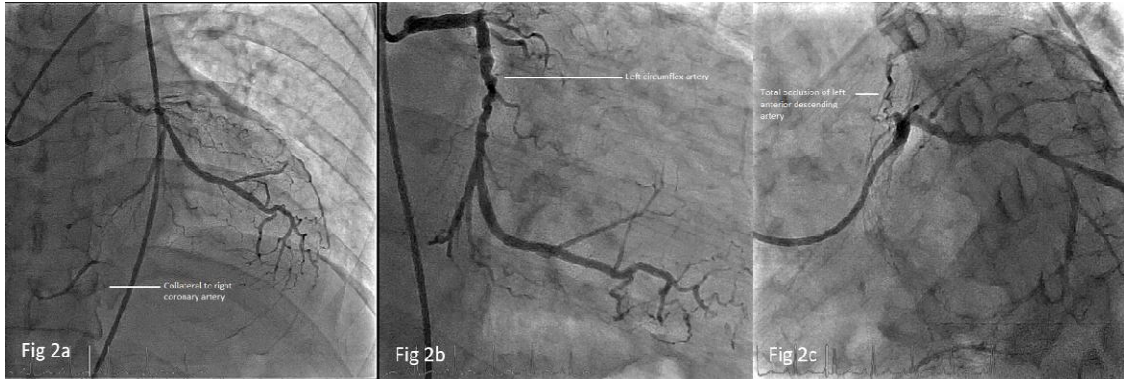


Fig. 2 (a-c). Coronary angiogram showed coronary artery subtotal occlusion of left anterior descending artery with collateral from left circumflex artery



Fig. 3. Coronary angiogram showed total occlusion of mid right coronary artery

ECG recorded ventricular tachycardia (VT) (Fig. 1b). Cardiopulmonary resuscitation (CPR) initiated, and he required a total of ten-minutes CPR, three-cycles of electrical defibrillation (biphasic 200 joules) and 1mg of intravenous adrenaline before the return of spontaneous circulation. Subsequent ECG showed ST-elevation V1 – V3 (Fig. 1c) and treated as Acute Anterior ST-Elevation Myocardial Infarction (MI). His coronary angiogram showed chronic total occlusion of mid-left-anterior-descending (LAD) artery and mild right-coronary-artery (RCA) stenosis with collateral from recessive circumflex-artery to both LAD (Fig. 2a-2c) and RCA (Fig. 3). Cardiac-magnetic-resonance-imaging showed MI of LAD and RCA territories with viable tissue. He was extubated well and planned for coronary-artery-bypass-graft.

3. DISCUSSION

In more than six decades, exercise stress test had been used widely for multiple indication which include detection of coronary artery disease (CAD); evaluation of anatomical and functional severity of CAD; evaluation of physical capacity and effort tolerance; evaluation of exercise-related symptoms; assessment of chronotropic competence, arrhythmias, and response to implanted device therapy and assessment of the response to medical interventions [4]. Among all, risk stratification of known or possible CAD remained one of the most common reasons for EST [5].

Throughout the years, many international professional guidelines clearly stated the set-up requirement of exercise stress testing lab, indication and contraindication, termination criteria of EST in order to safeguard the patient [3,4,6]. Although EST remained as a safe procedure in both young and elderly patient, however, vigorous physical activity can also transiently and acutely increase the risk of sudden cardiac death and acute myocardial infarction in susceptible individuals [6,7].

It is essential to identify patients with high short-term risk of death or nonfatal MI in a patient with unstable angina before EST. The presence of accelerating tempo of ischemic symptoms in preceding 48 hours; prolonged ongoing (>20 minutes) rest pain; pulmonary oedema related to ischemia, new or worsening mitral regurgitation murmur, S₃ or new or worsening lung crepitation, hypotension, bradycardia, tachycardia, age more

than 75 years; angina at rest with transient ST-segment changes more than 0.05 mV, new or presumed new bundle-branch block, sustained ventricular tachycardia and markedly elevation cardiac enzyme are all features suggestive of high risk of death or nonfatal MI [8]. This group of patients likely will be benefit from early invasive coronary intervention rather than undergoing stress study due to the possible risk.

In recent years, EST had reform from direct physicians supervised procedure to trained medical health care professionals (e.g. Nurses, physician assistants or exercise physiologist) lead test [3]. Although complication rates of EST were reported to be low, it remained important in careful patient selection and strict in observing the contraindication and termination criteria of EST. International guidelines also stressed the importance of well-trained of professional conducting the EST in recognising significant changes in rhythm, repolarisation on the ECG and in advanced CPR [2,4].

4. CONCLUSION

This case stressed the importance of identifying the cohort of patient with high-risk feature before EST, along with proper consent, an appropriate level of supervision by trained personnel and a well-equipped EST lab that able to provide immediate cardiac resuscitation measures during EST study.

CONSENT

As per international standard or university standard, patient's consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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