



Case Report

Acute myocardial infarction in young newbie bodybuilder using multiple steroid and protein supplements

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ABSTRACT

Coronary artery disease (CAD), the major reason of deaths worldwide is generally known as a disease of the elderly, however it is grasping the youth too. The most common etiology of young CAD is lifestyle changes, smoking, and development of other comorbid conditions such as diabetes and hypertension at an early age. There has been an upward trend in youngsters regarding consciousness about their body build and thus use of various protein supplements and anabolic steroids for faster results. The present case reports a young patient presenting with severe retrosternal left-sided chest pain for 15–20 min to the emergency department. His electrocardiogram was suggestive of acute anterolateral wall ST segment elevation myocardial infarction for which he underwent urgent coronary angiography and percutaneous coronary intervention. His personal history revealed a significant use of steroids, proteins, and other supplements in supraphysiological doses for instant body building efforts without any other significant past medical, surgical, or family history. He showed good recovery and was strongly recommended to stop steroids and protein supplements. In conclusion, supraphysiological doses of protein supplements, anabolic steroids, and other nutritional products bear a risk factor for CAD.

<Learning objective: This is evident from the case report that excessive supplements use by body builders for immediate mass gain and performance enhancement may lead to adverse cardiovascular complications. This is mostly prescribed by peer groups or untrained gym professionals without judging their adverse effects so we recommend a detailed history for steroid use and protein supplements in young patients presenting with acute myocardial infarction without other significant risk factors and need for counselling for use of such substances.>

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Introduction

Coronary artery disease is one of the major reasons for all deaths worldwide and there has been a persistent rise of young myocardial infarction (MI) in past years [1]. The most common etiology for young MI accounts for lifestyle modification which

includes sedentary life style, change in dietary habits, stressful and long working hours, strong family history, smoking, and development of other comorbid conditions such as diabetes and hypertension at an early age [2]. In recent times, there has been an upward trend in youngsters regarding body building and use of various protein powders and anabolic steroids for faster results. Androgenic anabolic steroids causing improvement in physical performance is a leading cause of acute MI and sudden cardiac death [3]. The commonly used anabolic steroids include stanozolol and testosterone when used in physiological doses acts as replacement therapy for improvement in appetite, libido, mood, and treatment of hypogonadism without any significant adverse effect. However, supraphysiological doses have been reported to increase the incidence of cardiovascular risks by regulating the expression of platelet thromboxane A2 receptors in humans [4]. A similar association has been reported by use of protein

Abbreviations: CAD, coronary artery disease; AMI, acute myocardial infarction; MI, myocardial infarction; STEMI, ST segment elevation myocardial infarction; PCI, percutaneous coronary intervention; TXA2, thromboxane A2; BCAA, branched-chain amino acid; TSH, thyroid stimulating hormone; LVH, left ventricular hypertrophy.

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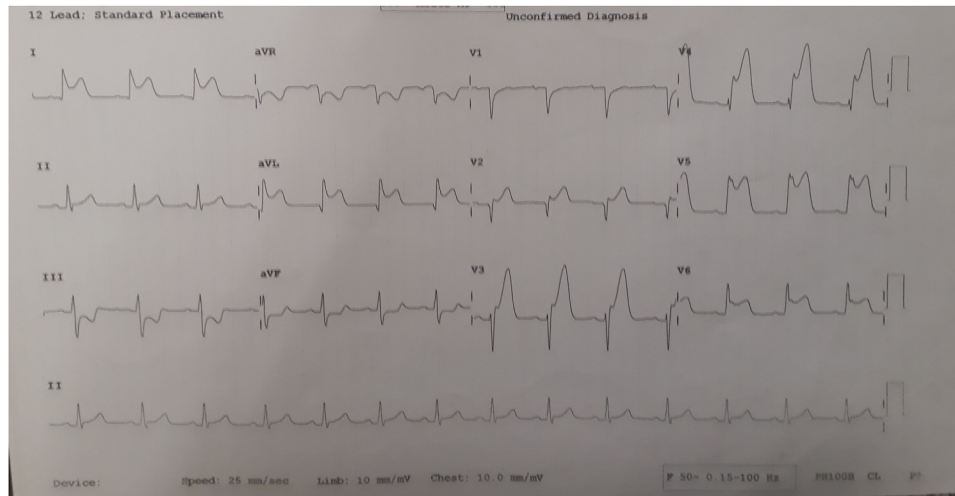


Fig. 1. Electrocardiogram showing ST elevation in I, aVL, V2–V6 suggestive of anterolateral wall myocardial infarction.

supplements and various amino acids without any specific pathological mechanism [5].

Case report

A 26-year-old male presented to the emergency department with symptoms of severe left-sided retrosternal chest pain radiating to left arm associated with diaphoresis since 15–20 min and an episode of vomiting after strenuous physical exercise in the gymnasium. He had known history of hepatitis A two years previously for which he took treatment. There was no history of diabetes, hypertension, coronary artery disease, or any other chronic illness or any significant family history. He was a civil engineer by profession with sedentary habits and occasional alcoholic intake without any smoking habits. His admission electrocardiogram showed ST elevation in I, aVL, and V2–V6 suggestive of acute anterolateral wall MI-STEMI (Fig. 1). He had been a newbie aggressive body builder for 2 months performing strenuous physical exercise in the gym for 2 h in morning and 2 h during evening time. He had been using whey proteins 500 g/day mixed in milk for the previous 2 months which was in excess of the daily prescribed limit by the vendor. Along with whey protein he also revealed history of using Epiq Shred Fat Burner [Iovate Health Sciences, US – Product discontinued] one capsule each day which is an appetite suppressant and he lost 6 kg of body weight in the previous 2 months. He also took branched-chain amino acid (BCAA) pre-work out powder, BCAA workout, L-glutamine powder one spoon each everyday which contains a variety of amino acids including leucine, isoleucine, and valine. He also revealed history of using injectable steroid Stanozolol 2 ml each week, Inj Testosterone 1 ml each week, and oral T3 (triiodothyronine) 25 mcg each day. Along with steroids and protein supplements he was also taking dietary supplements in the form of boiled chicken 250 g each day with fruit juices and milk shakes.

His admission vital signs showed heart rate of 85 beats per minute, regular, blood pressure of 110/70 mmHg, and blood sugar of 102 mg/dl. His body mass index was 21.5 kg/m². Based on clinical presentation and electrocardiogram findings he was immediately taken to the cardiac catheterization laboratory for urgent coronary angiogram after being given a loading dose of dual antiplatelets (dispersible aspirin 325 mg and ticagrelor 180 mg) and statins (rosuvastatin 40 mg).

His coronary angiogram revealed proximally occluded 90% thrombotic lesion in left anterior descending artery while the rest of the coronaries showed normal coronaries (Fig. 2). Given concern for thrombus he immediately underwent thrombus aspiration by Hunter catheter showing multiple white thrombi (Fig. 3) followed by balloon angioplasty with significant improvement in coronary flow. He was given intravenous eptifibatide of 180 mg/kg bolus followed by infusion of 2 mcg/kg/min for 24 h. His electrocardiogram post percutaneous coronary intervention showed normalization of ST-T changes in anterolateral leads. His admission investigations showed thrombocytosis (624,000/ μ l), serum hemoglobin 15.8 g/dl, total cholesterol 268 mg/dl, triglycerides 119.3 mg/dl, low-density lipoprotein 228 mg/dl, high-density lipoprotein 16 mg/dl, free T3 2.95 pg/ml, free T4 0.66 ng/dl, serum thyroid stimulating hormone 1.69 mIU/l, serum creatinine 1.21 mg/dl. His transthoracic echocardiogram revealed reduced left ventricular ejection fraction of 45%, hypokinetic apex, concentric left ventricular hypertrophy; pseudo normal mitral inflow pattern for normal cardiac chambers and valves. He was strongly recommended to stop steroids and protein supplements.

Discussion

Coronary artery disease used to be a disease of the elderly population but recent trends have shown advancements in the younger generation as well who most of the time present with STEMI [2]. The coronary artery disease in younger populations is mostly due to atherosclerosis which starts early in age or due to modifiable risk factors such as lifestyle including smoking, sedentary habits, and excessive use of certain drugs [6]. The present case report reveals the effect of supraphysiological doses of protein supplements, amino acids, and steroids leading to acute MI. The overuse of anabolic steroids such as testosterone and Stanozolol cause improvement in male sexual characteristics along with increase in muscle mass which is most commonly used by body builders throughout the globe for early benefit in muscle mass. These anabolic steroids have several detrimental effect on cardiac activity including hypertension, left ventricular hypertrophy, acute MI, or arrhythmias [7]. The high free T3 levels are associated with increased energy expenditure during rest and exercise and increase cardiac contractility and reduce systemic vascular resistance so it has been used by body builders to enhance performance during strenuous exercise. A study performed in

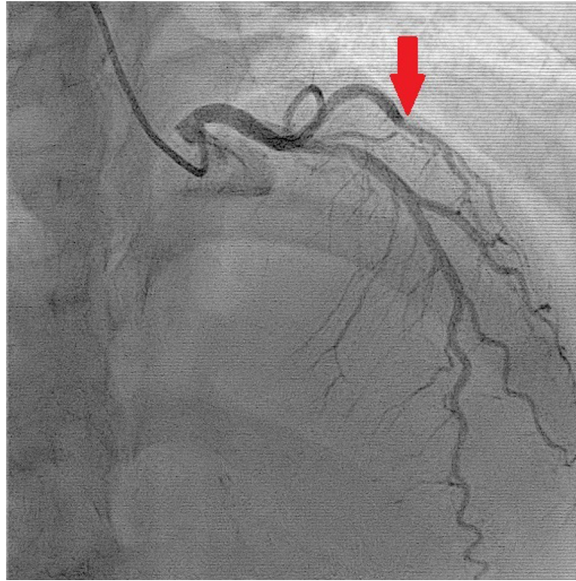


Fig. 2. Coronary angiogram showing thrombus in left anterior descending artery.

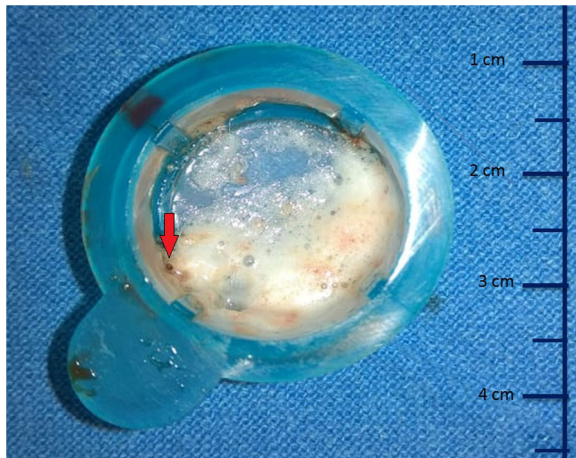


Fig. 3. White thrombus aspirated from left anterior descending artery.

Korea revealed the relation of triiodothyronine with severity of infarction in acute MI patients where high free T3 levels were associated with higher incidence of transmural involvement [8]. Along with steroids and T3, certain protein supplements such as whey protein and amino acids are individual risk factors for thrombus formation. In our case, there was peculiar presentation of white thrombi which are usually smaller, contain more fibrin as compared to red blood cells in red thrombus, and usually have a lesser ischemic time. According to a study by Quadros et al., STEMI patients having white thrombi have good clinical outcomes with lower mortality rates [9].

Conflict of interest

The authors declare that there are no conflicts of interest.

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