



A young soldier with syncope, shortness of breath and palpitations

Sinkopa, nedostatak vazduha i palpitacije kod mladog vojnika

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Abstract

Introduction. Coronary artery disease in people under 30 years is relatively uncommon, but once a disease occurs it brings a significant morbidity and psychological effects. **Case report.** We reported a 28-year-old patient presenting atypical symptoms after syncope and non-specific changes on electrocardiogram at admission. After noninvasive and invasive cardiology diagnostic procedures were made, we concluded that he had a subtotal tubular stenosis in proximal segment of the left anterior descending coronary artery. Myocardial revascularization was successfully performed 24-hour after coronarography with the left internal mammary thoracic artery graft on the left anterior descending coronary artery and the patient had a prompt and satisfactory postoperative recovery. **Conclusion.** This case indicates the importance of a careful evaluation of young adults even if they do not experience typical anginal symptoms or do not have multiple risk factors for cardiovascular diseases.

Key words: coronary disease; adult; age factors; diagnosis, differential; myocardial revascularization; treatment outcome.

Apstrakt

Uvod. Koronarna bolest je relativno retka kod bolesnika mlađih od 30 godina, ali za obolele iz ove starosne grupe nosi značajan morbiditet i psihosocijalne posledice. **Prikaz bolesnika.** Bolesnik, star 28 godina obratio se lekaru sa atipičnom simptomatologijom i nespecifičnim promenama u elektrokardiogramu. Nakon sprovedene neinvazivne i invazivne kardiološke dijagnostike zaključeno je da ima suptotalnu tubularnu stenozu prokismalnog segmenta prednje descendentne koronarne arterije. Potom, izvršena je hirurška revascularizacija miokarda graftom arterije mamarije interne na prednju descendentnu koronarnu arteriju, sa brzim i zadovoljavajućim postoperativnim oporavkom. **Zaključak.** Prikaz bolesnika ukazuje na značaj detaljne procene mladih bolesnika čak i ukoliko nemaju tipične anginozne tegobe i ne poseduju multiple rizike od kardiovaskularnih oboljenja.

Ključne reči: koronarna bolest; odrasle osobe; životno doba, faktori; dijagnoza, diferencijalna; miokard, revascularizacija; lečenje, ishod.

Introduction

Despite persistent progress in management strategies, coronary artery disease (CAD) remains a leading cause of mortality in the developed world with a continuous and predictable increase in the future¹. Recent reports of numerous investigators also suggest more frequent occurrence of CAD in population of young adults, but till now there have been no control trails in this cohort, and we are prone to exclude them from emergency departments before a careful evaluation.

Methods

A patient, 28-year-old soldier, was admitted to the hospital for further evaluation.

Before expression of any warning signs the patient was a soldier in infantry who had undergone through all examinations and regular trainings.

His symptoms had started five weeks before his arrival to our institution with palpitations, shortness of breath, fatigue and pain in lower extremities. He was hospitalized in a regional hospital where they at first had not verified any changes in electrocardiogram (ECG) and supposed that symptoms were consequences of pleuro-pericardial adhesions after viral infection.

One month later the patient was admitted again to emergency department of the regional hospital, after he had experienced a syncopal episode during a routine daily physical activity. Dynamic ECG alterations were observed during a serial ECG monitoring, elevation of ST segment up to 1 mm and

negative T waves from V2 to V5 leads, with normal cardiac enzymes during serial measurements, therefore the patient was transported to our institution with the same diagnosis.

After 24 hours normalization in ECG was observed without any alterations in repolarization. The neurologist was consulted immediately, thus any of acute neurological disorders, as cerebra vascular disturbances, autonomic nervous diseases, epilepsy, and abuse of psychoactive substances, were excluded.

Subsequently, the patient felt better with persistent complaints on chest pain in early morning lasting for 10 minutes followed by a spontaneous cessation. Chest pain was dull in quality without propagation, 3 from 10 in severity, and was not associated with diaphoresis, nausea, dizziness, lightheadedness, or a loss of consciousness.

Except for smoking up to 40 cigarettes per day during the past 13 years, we did not found any other positive risk factor for cardiovascular diseases including diabetes mellitus, hypertension, hiperlipemia, family history nor the presence of any systemic illness.

On physical examination the patient was not febrile, with blood pressure of 100/70 mmHg, and body mass index (BMI) in the range of normal values (23.8 kg/m²). Auscultation revealed regular breathing without wheezes, crackles, or bronchi. The patient had regular heart rhythm with an audible S1 and S2 with no gallops, rubs, murmurs; the abdomen was soft, nontender, and without any masses. No peripheral edema was present.

Electrocardiogram revealed sinus rhythm, frequency of 64/min, normal axis orientation, biphasic T waves from V2 to V6 (Figura 1). During a serial monitoring, ECG became normal with right bundle branch block (RBBB) incomplete, and without any changes in ST segment and T wave after 24 hours.

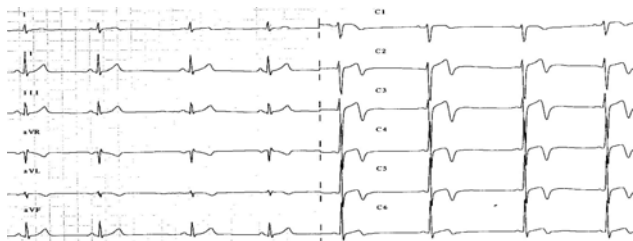


Fig. 1 – Electrocardiogram (ECG) of the patients at admission

In order to make a differential diagnosis with other also important states that could produce similar symptoms and results in ECG alterations we completed several non-invasive diagnostic procedures during the first 48 hours.

First transthoracic ECG was performed because it allowed an insight into the presence of any structural changes suggestive for pericarditis, some of congenital cardiomyopathies like hypertrophic or arrhythmogenic right ventricular cardiomyopathy, valvular disorders and also assessment of global and regional contractile functions. The left ventricle had the normal endocavitary dimensions, preserved global and a regional contractile function, with ejection fraction (EF) 65%. The left atrium had a normal size, and we recognized a discrete prolaps of anterior mitral cusps, with unremarkable mitral regurgitation. The aortic valve was competent morphologically and functionally. The pericardium seemed to be more intensive without a sign of pericardial effusion. Also, the chest radiograph was normal for that age. Subsequently, we did laboratory investigations, including a complete blood count, coagulation profile, serum electrolyte panel, and renal function tests (including creatinine level), and immunological assays to make differential diagnosis of any type of vasculitis, antiphospholipid syndrome or the presence of some other systemic illnesses. Rheumatoid factor, antinuclear antibodies (ANA), antineutrophil cytoplasmic antibodies (ANCA), antiphospholipid antibodies, lipid status, and glucose were unremarkable. Only nonspecific markers of inflammation, C-reactive protein (CRP) (6.73 mg/L) and fibrinogen (4.4 g/L) were slightly elevated.

Also we performed 24-hours holter ECG monitoring to exclude some disturbances in rhythm, but it revealed an average heart rate 73/min, max frequency 132/min, min frequency 58/min, 2 atrial premature beat (APB).

After 48 hours because of very suggestive alterations in ECG and persistent complaints of chest pain in early morning hours indicative for unstable angina we decided to avoid possibly provocative and dangerous tests as ergometry or dobutamine stress echocardiography. We made a multislice computed tomography (MSCT) coronary angiography as it was already proven to be safe and accurate method in young population². It indicated remarkable atherosclerotic plaque beginning from a distal part of left main to proximal segment of the left anterior descending (LAD) coronary artery (Figure 2a and 2b).



Fig. 2 – Multislice computed tomography (MSCT) coronary angiography: a) left main and b) proximal part of left anterior descending coronary artery

Coronary arteriography, performed one day after, revealed the left main of regular length and without stenosis. Proximal segment of the LAD revealed ostial subtotal, tubular stenosis (Figure 3), medial and distal part of LAD had

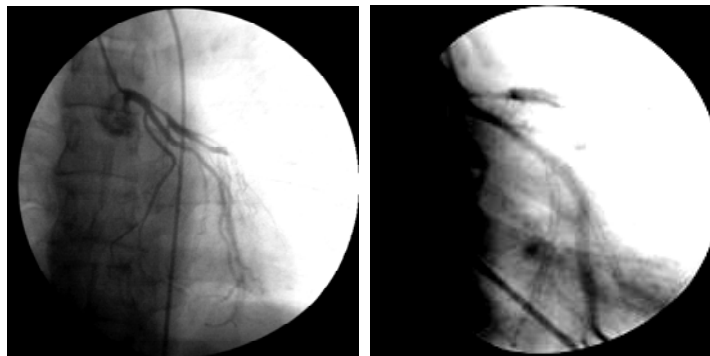


Fig. 3 – Coronary angiography: proximal left anterior descending coronary artery lesion

normal diameter without any stenosis. Repeated angiogram after the application of nitroglycerin revealed the same location and diameter of stenosis. The circumflex artery had a normal diameter without stenosis. The right coronary artery (RCA) was dominant and all the way through the artery without changes and stenosis.

Myocardial revascularization was successfully performed the following day with the left internal mammary thoracic artery graft (LIMA) on LAD and the patient had a prompt and satisfactory postoperative recovery.

Discussion

It is hard to establish the prevalence of CAD in young adults, because it is usually a silent process. The atheromatous process starts in early childhood. An investigation based on autopsy and histopathological analysis of atherosclerotic lesions among young adults who had died from various causes, revealed a high prevalence of atherosclerotic vulnerable plaques among young population and their association with conventional cardiovascular risk factors³.

Previous investigators reported a various risk profiles of this group of patients. Young adults with CAD usually have multiple risk factors. As it has been reported in several studies up to 90 percent of patients had more than one traditional risk factor for accelerated atherosclerosis^{4,5}.

According to the obtained results the most common identified risk factors for ischemic heart disease are male gender⁶, cigarette smoking⁶⁻⁹, obesity^{7,9}, dyslipidemia⁶⁻⁹ and to a lesser extent, systemic hypertension and diabetes^{6,7}. All of them, with the exception of gender, potentially are avoidable by physical or pharmacological means. Additionally, new risk factors for CAD like hyperhomocysteinemia and lipoprotein (a) and entirely unexplored areas like anger and psychosocial stress may have the same clinical implications in younger people^{10,11}.

Considering all conventional risk factors, our patient had only excessive smoking. In accordance with previous studies cigarette smoking seems to be an important and modifiable risk factor associated with premature atheroscle-

rosis¹²⁻¹⁵. Preventing the disease is probably the best way to improve results.

Indeed, premature CAD is a rapidly progressive form of atheromatous process. Angiographic findings are signifi-

cantly different in young adults with an increased prevalence of normal coronary arteries (up to 18%) and minor coronary artery abnormalities. Also, a single vessel disease was found in 38% of subjects in a coronary artery surgery study (CASS)¹⁶. These observational data emphasize the role of vulnerable plaques and plaque rupture as cause of acute presentation in younger people and the need to explore the mechanisms that could prevent conversion of stable plaques into unstable plaques.

In the presented case and in some previous reports¹⁷ it is crucial to emphasize the importance of careful evaluation within ST-T wave's changes during time. It is essential for making an appropriate differential diagnosis with other and also important conditions in young patients that demonstrate ST elevation that include normal patterns, early repolarization, pericarditis, hyperkalemia, pulmonary embolism, Brugada syndrome and arrhythmogenic right ventricular cardiomyopathy.

In the presence or absence of atherosclerosis, young adults can experience myocardial infarction, because etiologic factors range from atherosclerosis, nonatherosclerotic coronary artery abnormalities, hypercoagulable states and adverse drug effects¹⁸.

Non-atheromatous coronary artery abnormalities as a cause of acute presentation in emergency department are quite rare, but until now there are several reports on congenital coronary artery anomalies, myocardial bridging, coronary artery dissection, coronary artery aneurysms and embolisation from septic vegetation of infected aortic valve, or paradoxical embolisation from right to left through a patent foramen ovale¹⁹⁻²².

During the past decade there was an increasing number of young subjects who experienced acute coronary syndrome due to cocaine abuse and its vasospastic component, a procoagulation effect and increased sympathetic activity²³.

Also, it is important to consider in a differential diagnosis a potential presence of hypercoagulable states caused by antiphospholipid syndrome, nephrotic syndrome, or even mutations of factor V Leiden.

Prognosis in this group of patients varies from report to report, but certainly they have better earlier prognosis in

comparison to older, but CAD in young population can carry a poor long-term prognosis with up to 30% mortality in a 15-year follow-up²⁴.

Better prognosis was found in patients who had single vessel coronary artery disease. Furthermore, revascularization was associated with better success rate and survival, hazards ratio of 0.51 for percutaneous coronary intervention and 0.68 for coronary artery bypass grafting in patients less than 45 years of age.

Conclusion

This case indicates the importance of a careful evaluation of young adults even if they do not experience typical original symptoms or do not have multiple risk factors for cardiovascular diseases.

Nevertheless, the illness carries a significant morbidity, psychological effects, and financial consequences for the person even if it occurs in young ages.

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