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Case Report

The Elevated D-dimer Level, Pericardial Effusion and Acute Myocardial Ischemia in a Patient with a Syncopal Episode – A Challenging Case of the Acute Aortic Dissection

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Abstract

A 66-year-old woman was admitted to the emergency department after syncopal episode preceded by a crushing chest pain and bradycardia. On admission the patient presented with slight confusion and chest pain , varicose veins of the left lower extremity without swelling or signs of acute inflammatory process. The blood tests results showed thrombocytopenia, significantly elevated D-dimers level, lowered fibrinogen level and negative troponin test. Electrocardiography revealed signs of acute myocardial ischaemia. On echocardiography we found the lowered ejection fraction of the left ventricle with regional left ventricular contractility abnormalities, a small volume of pericardial fluid with a mobile fibrin strands, lack of signs of acute pulmonary embolism, normal sized ascending aorta without visible dissection. A chest computed tomography revealed fluid in the pericardial sac highly suggestive of the clotted blood , dissection of normal sized ascending aorta , a non-dissected aneurysm of the aortic arch and a saccular dilatation of the non-dissected proximal segment of the thoracic aorta.

Keywords: *Acute Aortic Dissection; Hemostatic Parameters; Electrocardiography; Echocardiography; Chest Computed Tomography*

The acute aortic dissection is a life - threatening condition demanding immediate diagnosis. The clinical manifestation of this vascular pathology is sometimes unusual and dependent on the section of the affected aorta. Some patients with acute aortic dissection can present with the symptoms of acute coronary syndrome, neurological disorders or other diseases [1,2]. The conventional imaging instrumentation such as transthoracic echocardiography does not always guarantee high diagnostic accuracy of the disease. In some cases, conventional chest computed tomography (CT) may not detect the site of perforation or even deliver an erroneous diagnosis [3]. Hence, simple to use and reliable biomarkers that will encourage physicians to suspect acute aortic syndrome are urgently needed. In recent years there have been an increasing number of scientific reports that investigate the utility of various blood parameters for the diagnosis of this potentially lethal disease [4,5].

We present a case of a 66-year-old woman with a history of arterial hypertension, hypothyroidism, subtotal strumectomy and cholelithiasis, who was admitted to the emergency department after syncopal episode preceded by a crushing chest pain and bradycardia. On admission, the patient presented with slight confusion and chest pain of moderate intensity, heart rate 75 beats per minute, blood pressure 100/70 mmHg, respiratory rate 18 breaths per minute, varicose veins of the left lower extremity without swelling or signs of the acute inflammatory process. Electrocardiography (ECG) revealed sinus rhythm 75 beats per minute with 2 mm ST-segment depression in leads V4-V5, transient 2 mm ST-segment elevation in lead aVR, 1 mm ST-segment elevation in lead V1, negative T waves in lead I and aVL indicative of acute myocardial ischemia. On echocardiography we found the left ventricle ejection fraction 40% with regional left

ventricular contractility abnormalities (apical akinesis), the normal size of cardiac chambers, the significant thickening of interventricular septum, moderate aortic regurgitation, a small volume of pericardial fluid (8 - 10 mm layer) with mobile fibrin strands adjacent to the free wall of the right ventricle. The age-matched dimensions of the ascending aorta and mean pulmonary artery pressure were within the normal limits. The blood tests results showed thrombocytopenia (106,000/μL), the significantly elevated D-dimers level (7,21 μg/ml), the lowered fibrinogen level (174 mg/dL). Troponin test was negative. CT revealed a 15 mm layer of fluid in the pericardial sac with radiodensity 50 - 60 Hounsfield Units highly suggestive of the hemopericardium (Figure 1), dissection of the normal-sized ascending aorta (width of the aorta 40 mm) (Figure 2), a non-dissected aneurysm of the aortic arch (width of the aortic arch 50 - 53 mm) (Figure 3), a saccular dilatation of the non-dissected proximal segment of the thoracic aorta and normal distal thoracic aorta.

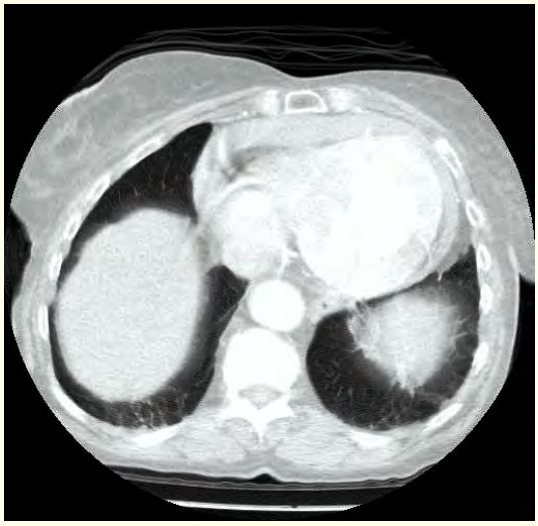

Figure 1: *Hemopericardium (CT).*

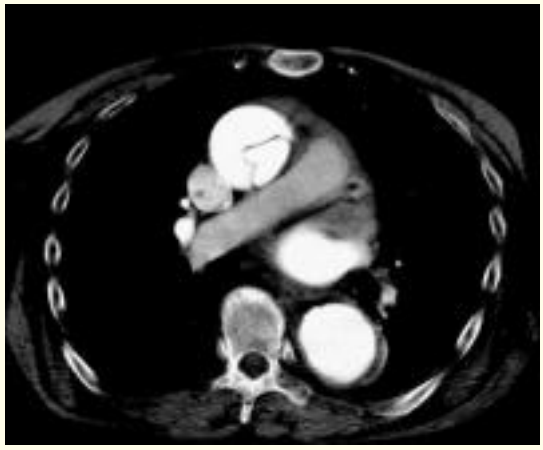

Figure 2: *Dissection of normal sized ascending aorta (CT - short axis view).*

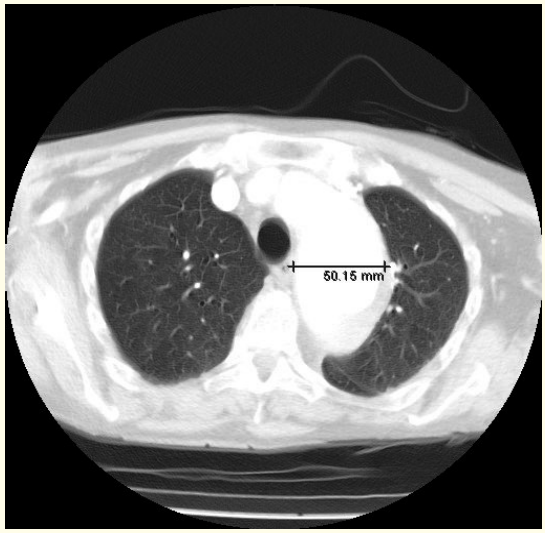

Figure 3: *Non- dissected aneurysm of aortic arch (CT).*

The symptoms presented by the patient, found ECG abnormalities, presence of varicose veins of the left lower limb and laboratory test results (high D-dimers level) might rather indicate acute pulmonary embolism and/or acute coronary syndrome than the acute aortic dissection at the first glance [6]. The ST-segment elevation in lead aVR and V1 with concomitant ST-segment depression in the precordial leads can be present both in patients with left main coronary artery disease and acute pulmonary embolism with hemodynamic instability [7]. Echocardiography excluded massive pulmonary embolism and found the normal - sized ascending aorta without a visible intimal flap in its lumen. Having regarded the high D-dimers level in blood, the acute aortic dissection (not visualized by echocardiography) penetrating into the pericardium was still suspected. However, the high - risk acute coronary syndrome with coexisting pericardial effusion related to hypothyroidism or previously undiagnosed inflammatory, systemic disease was also taken into account [8]. Finally, CT confirmed the acute dissection of the ascending aorta ruptured into the pericardial sac.

The significantly elevated D-dimers level with thrombocytopenia can result from hypercoagulation induced by the aortic dissection and subsequent clot formation. Many clinical conditions including inflammation, recent surgery and others can also cause an increase in D-dimer levels. Hence, a use of D-dimer as a positive biomarker should be supplemented by advanced diagnostic techniques in patients with chest pain. However, the normal D-dimer level has the meaningful potential to rule out the acute aortic syndrome in patients with a low clinical probability for the condition and differentiate between the acute aortic dissection and acute myocardial infarction as a cause of chest pain [9]. The meta-analysis of seven studies conducted by Shimony., *et al*. confirmed that normal D-dimer level (below 0,5 μg/ml) can be a useful screening tool to identify patients without the acute aortic dissection [5]. Furthermore, coronary angiography performed in patients with the acute aortic dissection resembling the acute coronary syndrome may delay time to surgery and thus have a strong impact on the preoperative and operative mortality [10]. Thus, the computed tomography of the aorta and coronary vessels seems to be an optimal diagnostic option in patients with acute chest pain, the significantly elevated D-dimers level and inconclusive or negative transthoracic echocardiography (no signs of acute pulmonary embolism or aortic dissection).

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