

Spontaneous Coronary Dissection with Dissection of Ascending Aorta and Cardiac Tamponade

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Abstract

Spontaneous Coronary Artery Dissection (SCAD) is a rare but potentially lethal event. A 46-year-old woman presented to her local hospital at 11:30 pm with an abrupt onset of severe chest pain, which occur one hour before. Diagnosis of acute myocardial infarction non-STEMI was set. The autopsy as a direct cause of death revealed cardiac tamponade from a ruptured dissection of ascending aorta that start with a rupture of right coronary artery. Microscopic examination of coronary artery revealed that a rupture occurred on junction between normal and abnormal intima and thin subintimal-media layer, because of loose of collagen fibers. Our case confirmed association of primary coronary artery dissections with female sex. As a direct cause of primary coronary artery dissection we identified loose of collagen fibers in intimal and subintimal-media layer.

Keywords: Coronary artery dissection; Dissecting aortic aneurysm; Cardiac tamponade; Acute myocardial infarction

Introduction

Spontaneous Coronary Artery Dissection (SCAD) is a rare but potentially lethal event. The cause of spontaneous coronary dissection is poorly understood. There are reported associations with female sex, exercise, pregnancy and postpartum state, coronary artery disease, connective tissue disorders and hemorrhage into the vasovasorum and periadventitial inflammation [1-7]. Most cases have no identifiable risk factor [1,7]. In patients presenting with acute coronary syndrome and cardiac tamponade, acute Spontaneous Coronary Artery Rupture (SCAD) is a possible diagnosis [8,9]. Patients may present with a broad spectrum of clinical scenarios, ranging from angina pectoris to myocardial infarction, cardiogenic shock, and sudden death [9-12]. In literature, only few cases of spontaneous coronary artery dissection causing cardiac tamponade were described [8,13-15].

As a very unusual complication of coronary intervention was simultaneous aortocoronary dissection with or without pericardial tamponade [16-19]. Some authors are making difference between spontaneous coronary artery dissection (SCAD) and rupture (SCAR) and suggest that SCAD is more common than SCAR as reported in the literature [14]. Most of authors suggest that this is same event [6].



Figure 1: A ruptured dissection of ascending aorta.

Case Report

History

A 46-year-old woman presented to her local hospital at 11:30 pm with an abrupt onset of severe chest pain, which occur one hour before. She was a smoker and had been not well treated for hypertension. She had a hysterectomy with both side adnexectomy, long time before. Clinical examination revealed pulse rate 69/min and blood pressure 170/100 mmHg. The electrocardiogram showed T wave inversion in D1, D3, V4, V5 and V6, with axis shift to the left. Echocardiography, both transthoracic and transesophageal, was not performed not even was planed. Diagnosis of acute myocardial infarction non-STEMI was set. During diagnostics procedures, nausea and the urge to vomit occur. She was given glucose solution 250 ml, gliceriltrinitrat, cardiopirin, ramipril, metamizole and ranitidine.

In medical records, there were no data about next 6 hours (from 00 to 06 am). Death pronounced at 06 am.

Autopsy

The autopsy was performed in Institute of Forensic Medicine in Nis, and as a direct cause of death revealed cardiac tamponade from a ruptured dissection of ascending aorta (Figure 1). Detailed examination of coronary arteries revealed that a dissection of ascending aorta start with a rupture of right coronary artery. A rupture of right coronary artery founded on its upper wall and 3 mm downstream from aorta, that was 3 mm long (Figure 2). A coronary arteries presented minimal

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Figure 2: A rupture of right coronary artery.

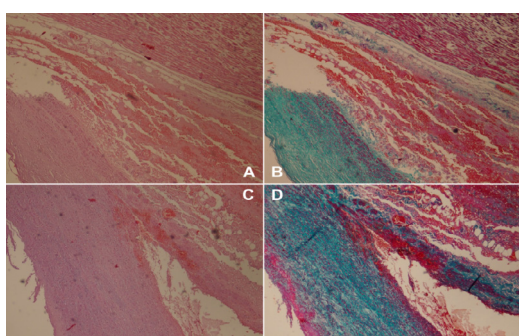


Figure 3: A hemorrhage under the rupture of coronary artery (A and B) and a longitudinal dissection of tunica media of ascending aorta (C and D), (microscopic view x40, HE and Masson's trichrome)

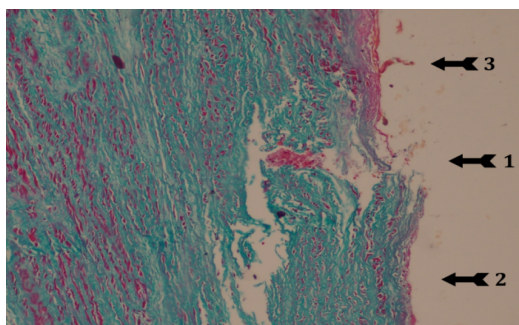


Figure 4: microscopic view x100, Masson's trichrome (1 - the rupture of coronary artery; 2 - normal intima and subintima of coronary artery, downstream of rupture; 3 - abnormal intima and subintima of coronary artery, upstream of rupture, because of loose of collagen).

atherosclerotic disease. The autopsy also revealed that a heart was slight hypertrophic with fatty permeation of right ventricle, severe fatty permeation of liver and chronic pyelonephritis.

Microscopic findings: Pathohistology examination confirmed macroscopic observations (Figure 3). Microscopic examination of coronary artery also revealed that a rupture occurred on junction between normal and abnormal intima and thin subintimal-media layer (Figure 4). Abnormal intima and subintimal-media layer are presented as a red colored zone (Masson's trichrome stain), because of loose of collagen fibers.

Toxicology findings: Toxicology was negative.

Discussion

Even though few reports of cases like this exist, we believe the disease might be underreported because an acute bleeding in the pericardium is often lethal and thus not recognized by doctors, as a literature suggests [13]. Primary coronary artery dissections, as in our case, are much less common than secondary dissections, and their etiology remains unclear. Associations of primary coronary artery dissections with female sex, exercise, pregnancy and postpartum state, coronary artery disease, connective tissue disorders and hemorrhage into the vasovasorum and periadventitial inflammation, have been noted [1-7]. Our case confirmed association of primary coronary artery dissections with female sex. As a direct cause of primary coronary artery dissection we identified loose of collagen fibers in intimal and subintimal-media layer with high blood pressure (170/100 mmHg on arrival in hospital). A connection between hormonal disturbances in women and connective tissue disorders, also as collagen, is well known. In our case, relationship between hormonal disturbances and connective tissue disorders (loose of collagen fibers in aorta) could be assigned to hysterectomy with both side adnexectomy, but this could not be confirmed. Myocardial infarction secondary to primary coronary artery dissection is exceedingly rare. While coronary artery dissection may present as acute myocardial infarction or as sudden death, sudden death accounts for the majority of presentations, thus leading to diagnosis usually at autopsy. In our case, presentation of acute myocardial infarction misleads doctors and precious time was wasted. If a dissection of coronary artery and aorta was recognized shortly after arrival in hospital, urgent thoracic surgery might save life of this woman.

Summary

In summary, we presented a case of a 46-year-old woman with acute myocardial infarction secondary to a right coronary artery dissection with propagation into dissection of ascending aorta and cardiac tamponade. This case should hold doctors caution when approaching a patient with acute myocardial infarction. Also, Masson's trichrome stain, as a very cheap histology stain technique, give as very important information that a primary coronary artery dissection could be connected with a collagen disturbances. Cases like this are extremely rare and presentation of our case should improve forensic medicine in understanding sudden death.

Because of technical and financial difficulties we could not perform other diagnostic procedures (immunohistochemistry, DNA analysis etc.), that could be very helpful to identify cause of coronary artery dissection. We are going to be honored to help further research and provide our material to scientists in this field.

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