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Spontaneous coronary artery dissection leading to acute myocardial infarction with reduced left ventricular ejection fraction in an otherwise healthy female: Case report and brief review of the literature.

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Abstract

In the following case a 46-year old non-smoking and healthy woman, with no previous coronary risk factors, was admitted at the department of cardiology at the regional university hospital following sudden onset of severe substernal chest pressure not associated with dyspnea or palpitations. The patient's electrocardiogram (ECG) revealed ST-segment elevation in the anterior leads. Bedside echocardiography showed anterior wall hypokinesis with a 40 – 45 % left ventricular ejection fraction (LVEF). Acute coronary angiography demonstrated dissection of the left anterior descending coronary artery (LAD) with associated intracoronary thrombus. The other coronary arteries were normal. A 2.5 x 28 mm Xience stent was deployed to cover the entire dissection and the patient tolerated the procedure without any significant complications and was discharged from the hospital four days later. The patient was asymptomatic on follow-up at 1 and 3 months.

Keywords

Spontaneous coronary artery dissection – acute myocardial infarction – healthy female – reduced LVEF

Introduction

Spontaneous coronary artery dissection (SCAD) is a rare condition that can cause acute myocardial infarction and sudden death, occurring predominately in otherwise healthy young women, and mostly during pregnancy and postpartum period[1]. Although several mechanisms have been postulated, no single etiology completely explains the pathogenesis of SCAD. Based on the etiology, patients suffering SCAD are divided into three major groups: a peripartum, atherosclerotic and idiopathic group[2]. The prognosis depends on which group the patient belongs to, but in general the long-term prognosis is favorable if the patient survives the acute phase[3].
In the following we report a rare case of SCAD in an otherwise healthy female.

Case presentation

A 46-year old non-smoking woman, with no previous coronary risk factors or family history of coronary artery disease was admitted at the department of cardiology at the regional university hospital at 20:00 pm, following sudden onset of severe substernal chest pressure not associated with dyspnea or palpitations. The patient had never before experienced chest pain or dyspnea, used no medications at all, was not pregnant currently and had never been pregnant before. There was no history of connective tissue disorders, drug abuse or relevant chest trauma.

The patient's electrocardiogram (ECG) revealed ST-segment elevation in the anterior leads(figure 1), blood pressure was 114/66 mmHg and physical examination was unremarkable The patient was considered having an acute ST-segment elevation myocardial infarction and was therefore treated with aspirin, brilique (ticagrelor) and unfractionated heparin according to the National Danish guidelines[4]. The first troponin I measurements taken at 20:30 pm were elevated 1572 ng/L (reference interval < 25 ng/L). Other laboratory findings including hemoglobin, electrolytes, hemoglobin 1AC, cholesterol and lipid profile and anticardiolipin antibody screens were within the reference limits.

Subsequently the patient underwent an acute coronary angiography, which revealed dissection of the LAD (figure 2). The other coronary arteries were normal. A 2.5 x 28 mm Xience stent was deployed to cover the entire dissection and the patient tolerated the procedure without any significant complications. Bedside echocardiography showed anterior wall hypokinesis with a 40 – 45 % LVEF. The second troponin I values taken the next morning at 09:00 am were 13.114 ng/L. Because of the reduced LEVF the patient was treated with one tablet 2.5 mg Ramipril daily, and one tablet 50 mg metoprolol daily as prophylactic treatment following AMI. The patient continued to take one tablet 75 mg aspirin daily (lifelong prophylactic treatment) and two tablets 90 mg brilique daily in the first year following stent implantation[4]. Four days later the patient was discharged home in a stable condition. On follow-up 1 and 3 months the patient was asymptomatic and echocardiographic examination did not show any further LEVF reduction.

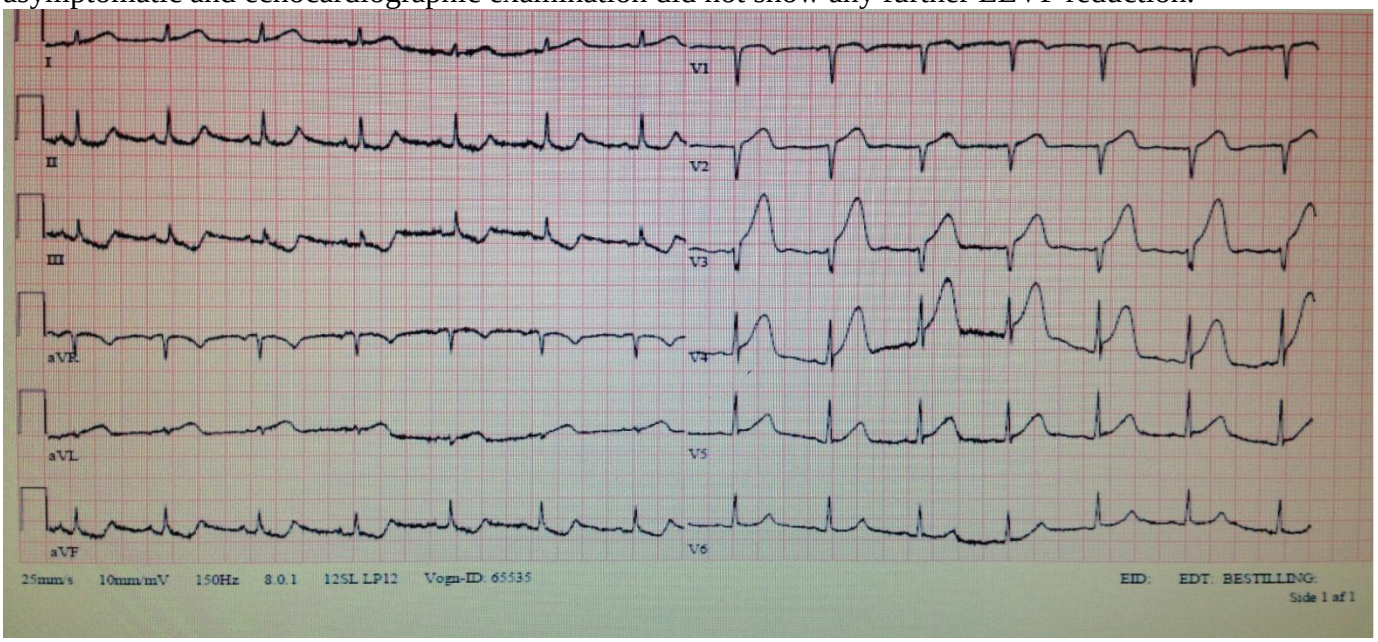
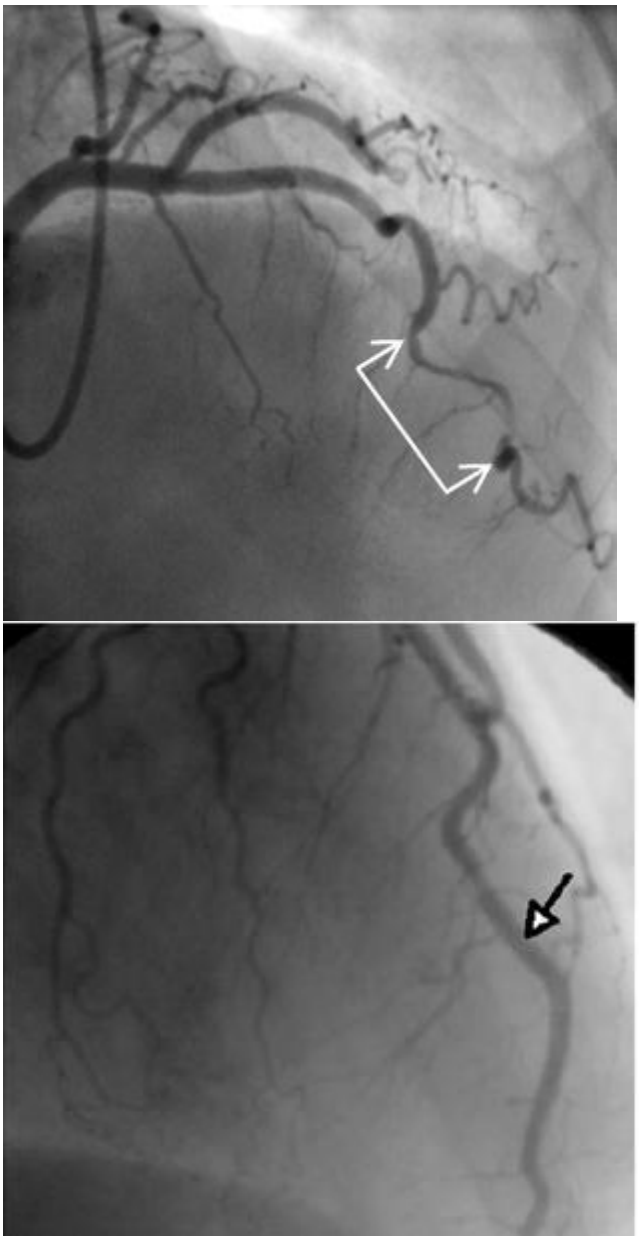


Figure 1: Patient's ECG on admission to the hospital demonstrating ST-segment elevation in the anterior leads.



A **B**

Figure 2: Coronary angiography: A) Demonstrating spontaneous coronary artery dissection of the LAD causing luminal constriction. B) Following stent placement (arrow) in the LAD revealing normalized blood flow.

Discussion

In the present case a 46-year old healthy, non-smoking woman, without any predisposition to coronary artery disease, suffers an AMI followed by LEVF reduction. Surprisingly an acute coronary angiography revealed SCAD as the cause of the AMI. The patient was treated with placement of an intracoronary stent without any following complications.

SCAD can present with sudden death, which is reported to occur in 50 % of cases, and the diagnosis may not be made unless an autopsy has been performed, while surviving patients may present with angina or AMI[5].

SCAD predominantly occurs as a single vessel disease, where LAD is most often involved (in 75 % of cases), followed by the RCA, the left main and circumflex artery[6].

It's well known that patients suffering this serious condition most often tend to be young healthy women, mostly in pregnancy and postpartum period. Kamineni et al.[5] reports on a healthy 34-year old woman, who suffered SCAD leading to AMI five days postpartum. The patient was treated with placement of intracoronary stent. However, the patient had a history of yearlong cigarette smoking.

The cause of SCAD has still not been completely explained and factors such as hypertension, collagen disorders, intense physical effort and contusive chest traumas have all been considered as risk factors according to Brunetti et al.[7], who also reports a case of SCAD in a patient with an unstable coronary plaque. Katikaneni et al.[8] reports on a patient, who develops cocaine-induced postpartum coronary artery dissection, while Raymond et al.[9] reports on a trauma induced coronary artery dissection.

Compared to our case, our patient was not pregnant or in the postpartum period, had no predisposition to coronary artery disease, was not drug abusive or cigarette smoker and did not have any collagen diseases or chest traumas, as is the case in many of the earlier reported cases in the literature, regarding patients with SCAD. This makes our case unique.

Searching the literature no standardized management plans for SCAD are found, but generally medical treatments are preferred in hemodynamically stable patients, while primary intracoronary stenting is more preferable when single-vessel disease is found. Surgical revascularization treatment is considered if the left main or more than a single coronary artery are involved[5, 7].

Regarding the prognosis, it is estimated that more than half of the patients presenting with SCAD die suddenly, while survivors may suffer serious complications such as propagation of the dissection with occlusion of important side branches of the involved vessel and formation of a pseudoaneurysm at the dissection site[10, 11].

Further, many of the surviving patients may develop a second dissection in the same or another coronary artery within few months of the initial event[12]. However, patients who survive the initial event have a good prognosis (survival rates of 80 % at 30 months), regardless of the treatment modality[2, 13]. Kamineni et al.[5] found better survival rates for men compared to women (93 % vs. 74 %). Another important issue is that mortality is higher in the non-peripartum group compared to the peripartum group. According to Kamineni et al.[5] there resides two explanations for this. The first is that the women in the non-peripartum group are older, and the second is that they are more likely to have multiple risk factors for coronary artery dissection.

Conclusion

SCAD is a rare and serious condition first reported by Pretty[14] in 1931. This condition is an uncommon, but important cause of myocardial infarction, mainly in young and otherwise healthy women during pregnancy and the postpartum period.

We report a rare case of a healthy 46-year old woman, without any risk factors to coronary artery disease, who suffers AMI and LEVF reduction due to SCAD. The condition was diagnosed by coronary angiography and successfully treated with intracoronary stent placement, and the patient was discharged home in a stable condition four days following hospitalization. The patient was asymptomatic on follow-up at 1 and 3 months.

After reviewing the literature, our most important message is, that physicians should be aware of this condition, when young women with no obvious risk factors, present with angina-like symptoms or AMI. Early diagnosis and treatment effectively reduce the high mortality associated with this condition.

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