

Spontaneous coronary artery dissection as a cause of myocardial infarction

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Core tip: In this case report, we discussed a patient who had a rare disease called spontaneous coronary artery dissection simultaneously in two different coronary arteries causing acute myocardial infarction. The presence of muscular bridge and spontaneous coronary artery dissection together at the same site of the left anterior descending artery was another interesting point which made us report this case.

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Abstract

Spontaneous coronary artery dissection (SCAD) is a rare disease that is usually seen in young women in left descending coronary artery and result in events like sudden cardiac death and acute myocardial infarction. A 70-year-old man was admitted to the emergency department with chest pain which started 1 h ago during a relative's funeral. The initial electrocardiography demonstrated 2 mm ST-segment depression in leads V1-V3 and the patient underwent emergent coronary angiography. SCAD simultaneously in two different coronary arteries [left anterior descending (LAD) artery and left circumflex (LCx)] artery was detected and SCAD in LCx artery was causing total occlusion which resulted in acute myocardial infarction. Successful stenting was performed thereafter for both lesions. In addition to the existence of SCAD simultaneously in two different coronary arteries, the presence of muscular bridge and SCAD together at the same site of the LAD artery was another interesting point which made us report this case.

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INTRODUCTION

Spontaneous coronary artery dissection (SCAD) is a rare cause of acute coronary events or sudden cardiac death. It typically affects young healthy women, particularly in the peripartum period^[1]. SCAD has been reported in patients with collagen disease, cocaine abuse, severe hypertension and severe psychological stress^[2]. Herein, we reported a case of simultaneous dissection of two coronary arteries, one of which caused acute myocardial infarction.

CASE REPORT

A 70-year-old man was admitted to the emergency department with chest pain which started 1 h ago during a relative's funeral. The patient had abandoned smoking 10 years ago and had no history of any cardiac disease. Physical examination was unremarkable and the heart rate of 60 beats/min and the blood pressure of 90/60 mmHg

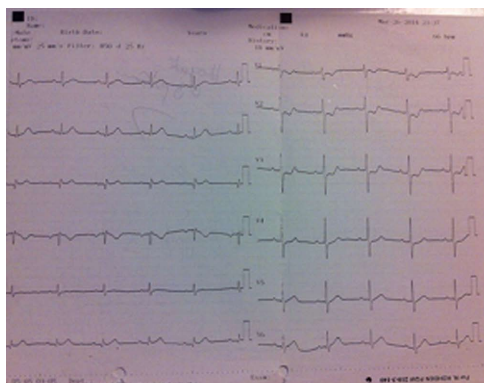


Figure 1 Electrocardiogram showing ST depression in leads V1-V3.

in the emergency unit. The initial electrocardiography demonstrated 2 mm ST-segment depression in leads V1-V3 (Figure 1). Bedside transthoracic echocardiography showed posterior hypokinesis with a left ventricle ejection fraction of 50%. After patient's transfer to coronary angiography laboratory, antiplatelet drugs, *i.e.*, 300 mg aspirin and 600 mg clopidogrel were administered. The patient underwent coronary angiography in which left circumflex artery (LCx) was totally occluded (Figure 2A) and left anterior descending artery (LAD) had a mid-segment dissection where a muscular bridge was located (Figure 2B). The LCx total occlusion was crossed with a floppy guidewire and then pre-dilated with balloon angioplasty. Then it was observed that LCx lesion had also dissection (Figure 2C). After careful evaluation of the previous angiographic views, the proximal segment of the LCx artery just proximal to the total occlusion had also dissection (Figure 2A), so it was thought that SCAD in LCx artery caused acute myocardial infarction. TIMI-3 blood flow was succeeded after stent implantation (3.0 mm × 28 mm everolimus eluting Xience Pro® coronary stent) with a good angiographic result (Figure 2D). However, the patient's chest pain increased and blood pressure decreased. Left coronary angiogram at anteroposterior projection with cranial angulation revealed LAD mid-segment was sub-totally occluded (Figure 2E). This lesion where a muscular bridge and coronary dissection were found together, was thought to be aggravated after intracoronary nitrate infusion. Then it was successfully stented with a 3.0 mm × 38 mm everolimus eluting coronary stent (Xience Pro®). TIMI-3 antegrade flow of LAD distal to the muscular bridge segment without any evidence of dissection was provided (Figure 2F). His hospital course was uneventful and he was discharged with medical treatment including aspirin, clopidogrel, metoprolol and atorvastatin. The patient was asymptomatic at 1-year clinical visit.

DISCUSSION

Primary SCAD is a rare cause of acute myocardial infarction and is with a high mortality rate of about 50%^[3]. The incidence of spontaneous coronary artery dissection for the public with AMI is estimated to be less than 1%^[4]. Due to the increased shear stress and proximities with the chest, it is

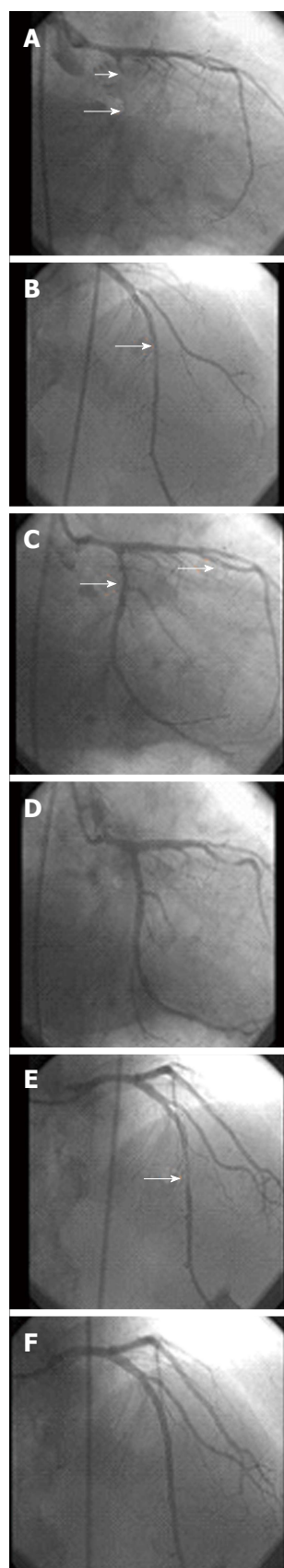


Figure 2 Coronary angiographic views of the patient. The arrows indicate left circumflex (LCx) total occlusion and proximal dissection in (A), coronary dissection in left anterior descending (LAD) (B), simultaneous coronary dissection in LAD and LCx arteries in (C) and subtotal occlusion and dissection at the site of muscular bridge in LAD in (E). Figure (D) and (F) show LCx and LAD arteries after successful stent implantation.

probable that dissection is widely found in the LAD. The spectrum of clinical presentation can range from unstable angina and myocardial infarction to sudden death. Early diagnosis and an aggressive treatment could improve the prognosis of patient with SCAD^[5,6]. Unfortunately there is no good definition of the optimal management of SCAD. The decision depends on the clinical presentation, hemodynamic condition, extent of the dissection, and number of vessels included^[7,8].

In our case, it was interesting that two coronary arteries had dissection at the same time. Despite the fact that the cause of LCx dissection might be balloon angioplasty of the total occlusion, we thought that spontaneous dissection was the cause of myocardial infarction because it was present just proximal to the total occlusion in LCx artery before the guidewire passage. An interesting point of this case was simultaneous dissection of the LAD and LCx arteries because multi-vessel SCAD is a rare situation discussed in few case reports^[9,10] and of them majority occurred in the peripartum period^[9]. In our case, the cause of the SCAD of both arteries might be the emotional stress that the patient came across.

In this case, the severity of LAD lesion was aggravated after intracoronary nitrate infusion during LCx artery stenting because the nitrates are known to increase the severity of lesions where muscular bridge is located. Another interesting point was the presence of the SCAD at the site of LAD where the muscular bridge was located. Whether the presence of muscular bridge facilitated the development of SCAD is not known but to our knowledge, the co-existence of these two different entities has not been published in the literature till now, so we cannot speculate such a cause-effect relationship.

In conclusion, we reported a rare case of SCAD simultaneously in two different coronary arteries causing acute myocardial infarction. The presence of muscular bridge and SCAD together at the same site of the LAD was another interesting point which made us report this case.

COMMENTS

Case characteristics

This case reported a case of simultaneous dissection of two coronary arteries, one of which caused acute myocardial infarction.

Clinical diagnosis

Physical examination was unremarkable and the initial ECG demonstrated 2 mm ST-segment depression in leads V1-V3.

Differential diagnosis

Acute coronary syndrome, pulmonary embolism.

Imaging diagnosis

The patient underwent coronary angiography in which left circumflex artery (LCx) was totally occluded and left anterior descending artery (LAD) had a

mid-segment dissection where a muscular bridge was located. After careful evaluation of the angiographic views, the proximal segment of the LCx artery just proximal to the total occlusion had also dissection.

Treatment

Stent implantation was performed to both lesions.

Related reports

It was rare in the literature that two coronary arteries had dissection at the same time. The presence of muscular bridge and spontaneous coronary artery dissection (SCAD) together at the same site of the LAD was another interesting point which has never been reported till now.

Experiences and lessons

Despite the rarity of SCAD, it may be the cause of acute coronary syndrome and cases should be evaluated separately to find the optimum treatment strategy.

Peer review

The authors have performed a good study, the manuscript is interesting.

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