Journal of Cardiology Cases xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase

Case Report

Simultaneous occurrence of spontaneous coronary artery dissections of the left anterior descending and right coronary arteries in acute myocardial infarction

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ARTICLE INFO

Article history:
Received 22 July 2016
Received in revised form 20 October 2016
Accepted 25 October 2016

Keywords:
Coronary dissection
Myocardial infarction
Intravascular ultrasound

ABSTRACT

Spontaneous coronary artery dissection (SCAD) is a rare and often fatal cause of ischemic heart disease that occurs predominantly in young or middle-aged patients who are otherwise healthy. Therefore, the accurate diagnosis of SCAD and initiation of appropriate treatment may be life-saving. Although recent case reports have described patients with SCAD who exhibited multiple coronary dissections in addition to the culprit lesion, the authors could not determine whether the multiple dissections occurred simultaneously or at different times. In this report, we describe a case involving the simultaneous occurrence of multiple SCADs in the right coronary artery and left anterior descending artery. Intravascular ultrasound helped us to confirm the diagnosis of multiple SCADs, confirm their simultaneous occurrence, and navigate the guidewire into the true lumen.

<**Learning objective:** In general, spontaneous coronary artery dissection (SCAD) is a single-vessel disease; the left anterior descending artery is the vessel most often involved, followed by the right coronary artery. However, the possibility of other coronary dissections distant from the culprit lesion should be considered in patients who present with an acute coronary syndrome due to SCAD. A prompt diagnosis and patient-tailored management can reduce morbidity and mortality in this population.>

Introduction

Spontaneous coronary artery dissection (SCAD) is a rare phenomenon, and it sometimes results in acute coronary syndrome and sudden cardiac death [1–3]. Although SCAD was previously thought to be a single-vessel disease, some cases involving dissections in multiple vessels have been reported [4–6]. However, it has not been clarified whether the multiple SCADs occurred simultaneously or independently.

We report on a case that involved the simultaneous occurrence of SCADs in the right coronary artery (RCA) and left anterior descending coronary artery (LAD) of a woman who presented with an acute myocardial infarction.

Case report

A 38-year-old woman presented with an acute myocardial infarction. She suddenly experienced severe anterior chest pain at rest, and walked to the nearest hospital. Her initial electrocardiogram (ECG) revealed 0.3 mV ST-segment elevation in the anteroseptal leads (V2–5) (Fig. 1A). Given her symptoms and ECG findings, the presumptive diagnosis was an acute anterior ST-elevation myocardial infarction (STEMI), and she was transferred to our hospital. She was not pregnant, and did not have risk factors for coronary atherosclerosis. There was no family history of sudden death, and no history of connective tissue disease, drug abuse, or recent trauma. After she was transferred to the emergency room of our hospital by ambulance, her repeat ECG on arrival was

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http://dx.doi.org/10.1016/j.jccase.2016.10.012
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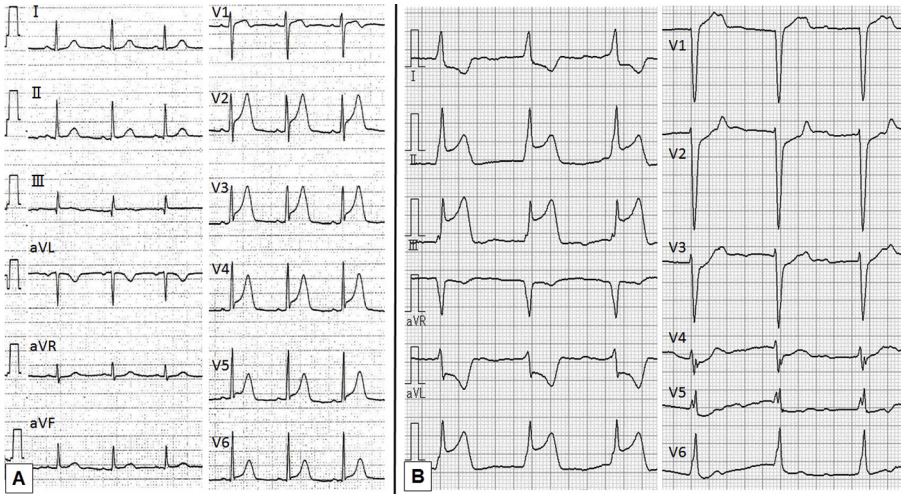

Fig. 1. Initial electrocardiogram (ECG) at presentation revealing ST-segment elevation in the anteroseptal leads (A). Second ECG 30 min after the initial ECG showing the complete resolution of the initial changes and ST-segment elevation in the inferior leads (B).

completely different from the ECG obtained at the previous hospital. The ECG at our hospital revealed 0.2 mV ST-segment elevation in the inferior leads II, III, and aVF, and complete resolution of the ST-segment changes in the anteroseptal leads (Fig. 1B). No elevation in her serum creatine kinase was detected in her admission blood sampling. Based on the findings of her second ECG, we suspected she was having an acute inferior STEMI, and she was referred for cardiac catheterization. The coronary angiography revealed a severe stenosis at the ostium of the RCA, and the presence of a thin longitudinal radiolucent line, representing an intimal medial flap with contrast staining (Fig. 2A). Her left circumflex coronary artery was smooth walled with no evidence of atherosclerosis, however, a mild stenosis was observed in the middle LAD (Fig. 2B). We then performed an intravascular ultrasound (IVUS) to assess the etiology of the arterial narrowing in the ostial RCA. The lesion was crossed with a 0.014-inch guidewire (SION Blue, Asahi Intec Co. Ltd., Aichi, Japan), which was steered into the distal-RCA with angiographic guidance. Subsequently, a 40 MHz IVUS catheter (ViewIt, Terumo Corp., Tokyo, Japan) was advanced into the RCA, and pulled back automatically at a speed of 1.0 mm/s up to the guiding catheter. The IVUS revealed an extensive circumferential dissection, with a mobile intimal flap that extended deep into the media layer at the culprit site, suggesting a SCAD (Fig. 3A–D). There was no evidence of atherosclerotic changes on the IVUS. Although we attempted repeated balloon dilations using a 3.0-mm coronary balloon with long inflation, there was a marked recoil of the lesion following balloon dilation. Therefore, a 3.5 mm × 23 mm drug-eluting stent (Xience Alpine, Abbott Vascular, Tokyo, Japan) was deployed to cover the entire dissection; the final IVUS examination demonstrated sealing of the dissection with good stent apposition. Another IVUS examination was performed to elucidate the cause of the mild luminal narrowing in the middle LAD. The IVUS demonstrated a medial dissection with an intramural hematoma that started at the middle segment of LAD and extended into the distal segment of LAD; there was no evidence of atherosclerosis (Fig. 3E and F). The patient's chest pain symptoms disappeared completely and the ST-segment elevations on the ECG resolved after the intervention, and she was discharged on aspirin and clopidogrel. She is currently asymptomatic and is scheduled for a repeat coronary angiogram 8 months after the intervention.

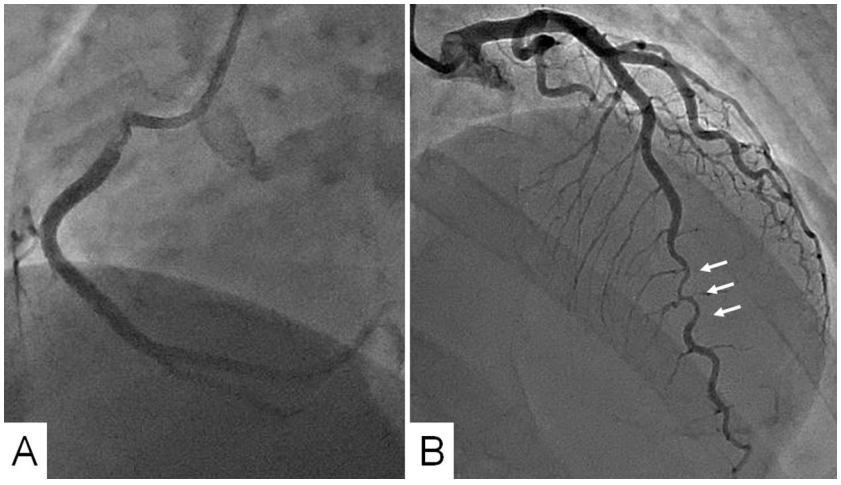

Fig. 2. Left anterior oblique projection showing a flap-like filling defect in the proximal right coronary artery (A). A diffuse, confined lesion in the mid left anterior descending artery (arrows) (note normal proximal and distal segments) is identified (B).

Please cite this article in press as: Yamamoto W, et al. Simultaneous occurrence of spontaneous coronary artery dissections of the left anterior descending and right coronary arteries in acute myocardial infarction. J Cardiol Cases (2016), http://dx.doi.org/10.1016/j.jccase.2016.10.012