Cardiovascular Revascularization Medicine xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Cardiovascular Revascularization Medicine

Case report

Successful treatment of a nonagenarian patient with acute coronary syndrome complicated with chronic total occlusion of the left main coronary artery☆

Yukio Mizuguchi *, Sho Hashimoto, Hiroki Shibutani, Takeshi Yamada, Norimasa Taniguchi, Shunsuke Nakajima, Tetsuya Hata, Akihiko Takahashi

Cardiovascular Section, Sakurakai Takahashi Hospital, 5-18-1 Oikecho, Suma-ku, Kobe, Hyogo 654-0026, Japan

ARTICLE INFO

Article history:
Received 25 August 2016
Received in revised form 8 October 2016
Accepted 14 October 2016
Available online xxxx

Keywords:
Acute coronary syndrome
Nonagenarian
Chronic total occlusion
Left main coronary artery

ABSTRACT

Although chronic total occlusion of the left main coronary artery (LMCA) is considered very rare, this condition could be fatal if it becomes complicated with an acute coronary syndrome lesion in the right coronary artery (RCA) which is usually the only remaining coronary artery for the myocardium. We reported a successfully treated case of a nonagenarian patient with ST-segment elevation myocardial infarction, who had subtotal occlusion of the RCA and total occlusion of the LMCA with Rentrop grade 2 collateral coronary artery supply from the RCA.

1. Introduction

Chronic total occlusion (CTO) of the left main coronary artery (LMCA) is considered very rare, with an incidence of 0.04% to 0.1% on cardiac catheterization [1–3]. This condition could be fatal if it becomes complicated with an acute coronary syndrome (ACS) lesion in the right coronary artery (RCA) which is usually the only remaining coronary artery for the myocardium.

2. Case report

A 90-year-old man with a history of cerebral infarction, chronic obstructive pulmonary disease, and hypertension presented sudden hemodynamic compromise and was taken to our hospital on an ambulance. Physical examination on arrival at the hospital revealed a blood pressure of 95/60 mmHg and a heart rate of 105 bpm. An electrocardiogram (ECG) test revealed ST elevations in leads aVR and V1-V3 with significant ST depressions in leads I, aVL, and V5-V6 (Fig. 1). An echocardiography showed severe left ventricular dysfunction with ejection fraction of 18% (Video 1 in the online version at doi:10.1016/j.carrev.2016.10.004). An immediate coronary angiography revealed subtotal occlusion of the RCA and total occlusion of the LMCA with Rentrop grade 2 collateral coronary artery supply from the RCA (Fig. 2A, B, and C). A 6-Fr intra-aortic balloon pump (IABP) was introduced, and primary percutaneous coronary intervention (PCI) for the RCA was subsequently performed. After engagement of a 6-Fr SL3.5 guiding catheter (Heartrail II; Terumo, Tokyo, Japan), a Runthrough NS™ guidewire (Terumo) was crossed into the stenosis. A 4.0 × 18-mm drug-eluting stent (Resolute Integrity; Medtronic, Dublin, Republic of Ireland) was implanted after the predilation with a 2.5 × 15-mm balloon catheter (Fig. 3A and B). Subsequently, we tried to advance a Sion guidewire to the LMCA lesion; however, as the wire could not cross the lesion, we considered that it was a CTO lesion. The patient was transferred to the coronary care unit. His hemodynamic condition was still deteriorated with a cardiac index of 1.0–1.1 L/min/m^2 (Fig. 4), and he developed ventricular fibrillation (VF) which resulted in successful cardiopulmonary resuscitation including bronchial intubation and electrical defibrillation. To improve the myocardial blood circulation, a second PCI was performed 8 h after the primary PCI. A 6-Fr EBU3.5 guiding catheter (Medtronic) was inserted from the right brachial artery. Initially, a SION guidewire was again advanced with a Caravel microcatheter; however, the tip of the guidewire did not enter any further into the proximal side of the occluded lesion in the LMCA. Thereafter, a Fielder XT-R guidewire (Asahi Intecc, Nagoya, Japan) was introduced in the Caravel microcatheter (Asahi Intecc) and advanced into the occluded lesion. After considerable manipulation, the tip of the guidewire was successfully introduced into the left coronary artery (Fig. 5A). The microcatheter jumped forward abruptly after gentle twisting. The guidewire was retrieved and replaced by a Sion Blue

☆ Disclosure statement: All authors report no financial relationships or conflicts of interest regarding the content herein.

* Corresponding author.
E-mail address: yukiomizuguchi@gmail.com (Y. Mizuguchi).

http://dx.doi.org/10.1016/j.carrev.2016.10.004
1553-8389/

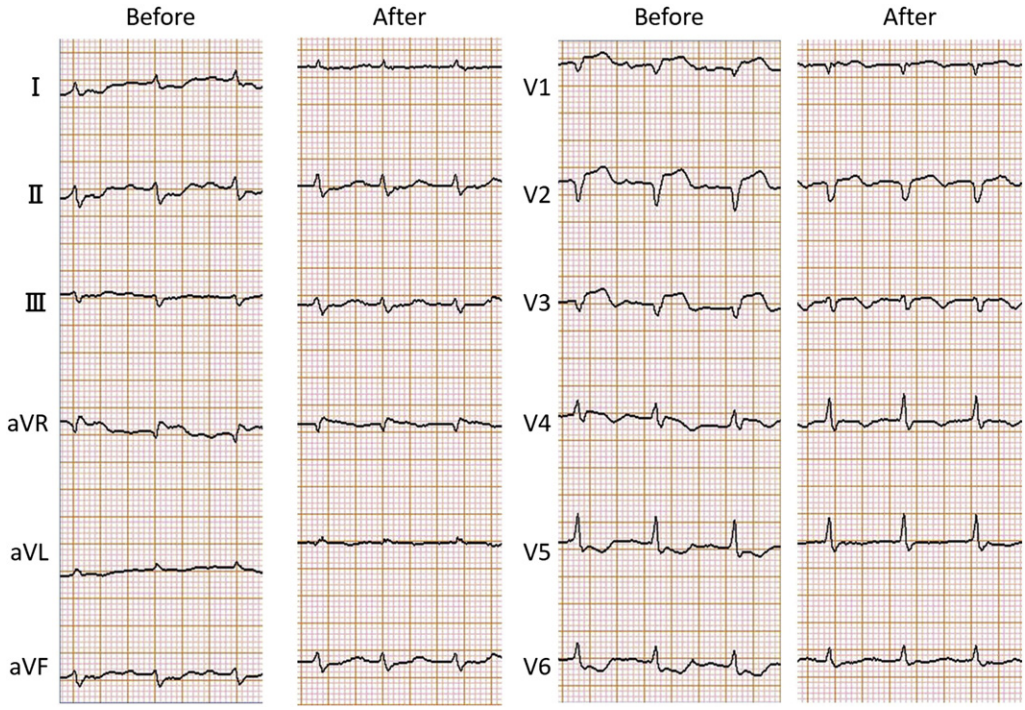

Fig. 1. An electrocardiogram (ECG) test. (Left) An ECG test before first percutaneous coronary intervention (PCI) revealed ST elevations in leads aVR and V1-V3 with significant ST depressions in leads I, aVL, and V5-V6. (Right) An ECG test after first PCI revealed the ST resolution in leads aVR and V1–3.

guidewire. Following predilation for the proximal part of the left anterior descending (LAD) and left circumflex (LCX) artery, a 3.0 × 15 mm Xience Alpine stent (Abbott Vascular, IL, USA) and 3.0 × 22 mm Resolute Integrity stent (Medtronic) were deployed in the LMCA to the LCX artery and the LMCA to the LAD artery, respectively, with a mini-crush stent technique. A coronary angiogram after final kissing balloon dilatation revealed sufficient dilation of the lesion (Fig. 5I). The cardiac enzyme on day 1 after PCI revealed slight elevation of serum creatinine kinase (the peak serum creatinine kinase [CK] and CK-MB levels were 1653 IU/L and 220.8 IU/L, respectively) (Fig. 6). The cardiac index was improved to 1.7–1.9 L/min/m^2 (Fig. 4), and the left ventricular wall motion was also improved (Video 2 in the online version at doi:10.1016/j.carrev.2016.10.004). Removal of the mechanical ventilator and IABP was successfully performed 3 days after the second PCI. On the 5th day, the patient developed VF again, and an extra-corporeal membrane oxygenator (ECMO) and IABP was introduced after unsuccessful resuscitation. A subsequent emergency coronary angiogram revealed no stenosis and occlusion site in the RCA and LMCA. As the VF was well controlled by nifekalant hydrochloride and sotalol hydrochloride, the ECMO was retrieved safely on the same day. Thereafter, the patient made satisfactory progress and was discharged 39 days after hospital admission without any complication.

3. Discussion

We reported a case of ACS in which the culprit lesion was located in the RCA and was complicated with CTO in the LMCA. To the best of our knowledge, this is the first reported case of successful treatment for ACS with CTO in the LMCA.

Although the current guidelines for ST-elevation myocardial infarction (STEMI) recommend infarct-related or culprit vessel-only revascularization during primary PCI in patients with multi-vessel disease, the suitable timing of the PCI for the non-culprit lesion in those patients is controversial, especially when complicated with shock [4]. In fact, several studies of multi-vessel PCI in STEMI patients with cardiogenic

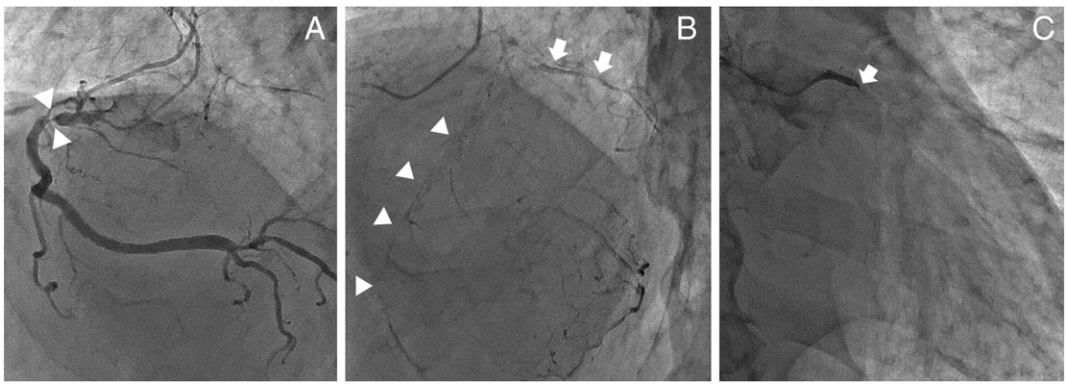

Fig. 2. Diagnostic coronary angiogram. (A) Right coronary angiography (left anterior oblique cranial view) shows a severe stenosis of the proximal part of the right coronary artery (RCA) (white arrowheads). (B) Right coronary angiography (left anterior oblique cranial view) shows that the left anterior descending artery (white arrowheads) and the left circumflex artery (white arrow) were supplied mainly by collateral vessels from the RCA. (C) Left coronary angiography (right anterior oblique caudal view) shows a chronic total occlusion of the left main coronary artery (white arrow).

Please cite this article as: Mizuguchi Y, et al, Successful treatment of a nonagenarian patient with acute coronary syndrome complicated with chronic total occlusion of the left main coronary artery, Cardiovasc Revasc Med (2016), http://dx.doi.org/10.1016/j.carrev.2016.10.004