Acute Myocardial Infarction with Severe ST Segment Elevation Treated with Percutaneous Coronary Intervention More than Two Days after Onset: A Case with Remarkable Recovery

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ABSTRACT

The patient was a 65-year-old man with marked ST-elevation myocardial infarction. Cardiac catheterization revealed an occluded middle portion of the left anterior descending artery and no collateral circulation. Percutaneous coronary intervention (PCI) was performed, and ST elevation improved 5 days after PCI. Almost all electrocardiogram (ECG) findings were normal 6 months later. Echocardiographic findings were also normal. This case was very successful and unusual in that no ventricular aneurysm formed despite ST elevation continuing for a few days and that ECG and left ventricular function were nearly normal after PCI performed days after the onset in a case without collateral circulation.

KEYWORDS: ST segment elevation myocardial infarction, percutaneous coronary intervention, infarct size

CASE REPORT

The patient was a 65-year-old man with noncontributory medical history. He had been smoking 20 cigarettes/day for 40 years. His history of present illness included dyslipidemia, which was untreated. On March 3, 2008, he developed his first continuous chest pain lasting for 5 hours. Pain subsided temporarily but recurred on the morning of March 5, and he presented to the hospital that evening. His electrocardiogram (ECG) showed marked ST elevations in V1-V4 (maximum 1 mV) and Q waves in V2 and V3. Blood test findings when he

arrived at the hospital were as follows: white blood cell count 13000/ μ L, creatine kinase (CK) 208 IU/L, aspartate aminotransferase 57 IU/L, positive troponin T, total cholesterol 230 mg/dL, high-density lipoprotein cholesterol 75 mg/dL, low-density lipoprotein cholesterol (LDLC) 139 mg/dL, triglyceride 100 mg/dL, creatinine 0.8 mg/dL, C-reactive protein 0.2 mg/dL, brain natriuretic peptide 60.8 pg/mL, blood sugar 148 mg/dL, and hemoglobin (HbA1c) 5.6%. His echocardiogram showed moderate hypokinesis of the anterior wall, septum, and apex. Administration of heparin (15,000 units), aspirin

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Int J Angiol 2011;20:103–106. Copyright © 2011 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel: +1(212) 584-4662.

Published online: June 3, 2011.

DOI: <http://dx.doi.org/10.1055/s-0031-1279680>.

ISSN 1061-1711.

Figure 1 Left coronary angiograms before PCI (left) and immediately after PCI (right). Occlusion was observed in the middle portion of the left anterior descending coronary artery. PCI, percutaneous coronary intervention.

(100 mg), clopidogrel (75 mg), atorvastatin (10 mg), nicorandil (10 mg), and telmisartan (20 mg) were initiated. Cardiac catheterization revealed an occluded middle portion of the left anterior descending artery and no collateral circulation. Thrombus aspiration and stent placement (Microdriver 2.5 mm $\times$ 14 mm, Medtronic, Inc., USA) were performed during percutaneous coronary intervention (PCI), and reperfusion was achieved without slow flow or stenosis (Fig. 1). The maximum CK level was 898 IU/L. Lactate dehydrogenase (LDH) was 648 IU/L at admission, 320 IU/L the following day, and 490 IU/L 2 days after admission, indicating re-elevation (Table 1). Carvedilol (1.25 mg) was administered 14 days after PCI. The postoperative course was uneventful, and ST elevation improved 5 days after PCI. T-wave inversion occurred 2 weeks later, and R-wave amplitude gradually increased. All ECG findings were normal 6 months later except for poor R-wave progression in V2 (Fig. 2). Echocardiographic findings were also normal except for mild hypokinesis of the anterior wall and septum (ejection fraction 72%).

The determination of the time of onset was based on two peaks of LDH and symptoms, and the time of onset was thought to be 2 days before admission and the morning of admission ($\sim$ 8 hours before

PCI). ST elevation, presence of QS wave, and T-wave inversion are typical changes in acute ST-elevation myocardial infarction. This case was very unusual in that no ventricular aneurysm formed despite ST elevation continuing for a few days and that ECG and left ventricular function were nearly normal after PCI performed days after the onset in a case without collateral circulation.

DISCUSSION

The small infarct size might have been due to preconditioning.¹⁻³ Reperfusion injury⁴⁻⁶ is characterized by slow flow and ST re-elevation due to reperfusion, and it is thought to be a prognostic factor for chronic left ventricular asynergy. PCI (thrombus aspiration and stent placement) can displace plaque or thrombus onto a vascular wall. In this study, one reason for the patient's uneventful course was thought to be the lack of such displacement, which could have resulted in distal embolism in the coronary artery. Statins have been found to stabilize plaques.⁷⁻¹⁰ LDLC was reduced to less than 85 mg/dL early after onset, and a β -blocker¹¹ was administered at an early stage. These actions were also thought to have contributed to the reduction of infarct size.¹²⁻¹⁶

Table 1 Serial Changes in Levels of CK, LDH, and Troponin T

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 14
CK (IU/L)	208	690	898	190	54	45	53	50
LDH (IU/L)	648	320	490	351	290	251	244	180
Troponin T	+	+						

+, positive; CK, creatine kinase; LDH, lactate dehydrogenase.

Figure 2 Serial changes of the resting ECGs. In the resting ECG after PCI, ST elevation and QS waves recovered gradually. ECG, electrocardiogram; PCI, percutaneous coronary intervention.

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