A 64-year-old man with total occlusion of the left main coronary artery associated with acute anterior infarction was treated successfully with combined emergency intracoronary thrombolysis and coronary bypass surgery. Postoperative angiography demonstrated patent bypass grafts with good preservation of left ventricular function.


A CUTE occlusion of the left main coronary artery (LMCA) is a rare, but catastrophic, event which requires early treatment for survival.1–10 This report describes a patient with acute total occlusion of the LMCA treated successfully with combined emergency intracoronary thrombolysis and coronary bypass surgery.

CASE REPORT

On October 8, 1990, a 64-year-old man was admitted to the coronary care unit 1h after the onset of persistent retrosternal chest pain. His blood pressure was 102/84 mmHg, and pulmonary rales were present bilaterally. An electrocardiogram showed ST segment elevation in leads V1 to V3 and ST depression in lead V5 with Q waves in leads I and aVL (Fig. 1). Emergency coronary angiography revealed total occlusion of the LMCA and no significant stenosis of the dominant right coronary artery with minor retrograde collateral filling of the left anterior descending and circumflex arteries (Fig. 2). Intravenous infusion of dopamine and nitroglycerin was initiated. Nonetheless, severe left-sided congestive heart failure persisted; blood pressure was 120/76 mmHg, pulmonary capillary wedge pressure 33 mmHg, and cardiac index 1.90 L/min/m². An intraaortic counterpulsation balloon was inserted. Intracoronary infusion of urokinase 240,000 IU was started, and partial recanalization of the LMCA was demonstrated 2.2h after the onset of chest pain. After thrombolysis, the cardiac index increased to 2.59 L/min/m², and pulmonary capillary wedge pressure decreased to 20 mmHg. However, there was a residual severe stenosis of the LMCA with delayed filling of the left anterior descending and circumflex arteries (Fig. 3). It was decided that emergent coronary bypass grafting be performed. Serial cardiac enzymes showed a peak creatine phosphokinase of 3,828 IU/L with MB fraction of 238 IU/L.

Two-vessel saphenous vein bypass grafts were placed in the left anterior descending and circumflex coronary arteries 6.5h after the onset of chest pain, and began to perfuse the ischemic myocardium. The patient was

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weaned from the intraaortic balloon pump within 48h, and the postoperative course was uneventful. Cardiac catheterization and angiography were repeated on the 35th postoperative day. The cardiac index was 4.47 L/min/m² and pulmonary capillary wedge pressure 8 mmHg. Bypass grafts were patent. Left ventriculography demonstrated mild anterior hypokinesis with an ejection fraction of 0.61 (Fig. 4). An electrocardiogram on the 38th postoperative day showed slight terminal inversion of T waves in leads V1 to V3 and inversion of T waves with Q in I and aVL (Fig. 5). Thallium-201 single-photon emission computed tomography (SPECT) was performed on the 41st postoperative day. Stress SPECT imaging revealed no significant defect, except for a small persistent defect at the apex (Fig. 6). The patient was discharged on the 42nd postoperative day and was doing well four months postoperatively.

Fig. 1. Electrocardiogram on admission showing acute anterior ischemia.

Fig. 2. Left coronary angiogram demonstrating total occlusion of the left main coronary artery (fig. 2A). Right coronary angiography showing collaterals with retrograde filling of the left anterior descending and circumflex arteries (Fig. 2B).

Fig. 3. Left coronary angiography after intracoronary thrombolysis. There is still severe left main coronary artery stenosis.
DISCUSSION

Acute total occlusion of the LMCA is a common cause of sudden death because of its association with extensive myocardial infarction. It is rarely demonstrated by coronary angiography. Emergency reperfusion is necessary not only for survival but also for the preservation of left ventricular function in patients without adequate collateral flow from the right coronary artery. In our opinion, as well as that of others, intracoronary thrombolysis is the procedure of choice for emergency reperfusion in patients with acute myocardial infarction. Between January 1987 and December 1990, 360 patients were admitted to the coronary care unit at Wakayama Red Cross Hospital with acute myocardial infarction. Of the 360 patients, 275 (76.4%) were treated with emergency intracoronary thrombolysis and/or coronary angioplasty, including eight (2.2%) who required subsequent bypass surgery.

To our knowledge, there have been 25 reported cases of acute occlusion of the LMCA demonstrated by coronary angiography. Emergency reperfusion was attempted in 17 patients but not in eight. In 10 patients, emergency intracoronary thrombolysis and/or coronary angioplasty was attempted to achieve reperfusion and to recanalize the LMCA; 5 patients died. In 6 patients, emergency intracoronary thrombolysis and subsequent bypass surgery were performed; one died. One patient who underwent emergent coronary bypass grafting without thrombolysis therapy died. Of the remaining 8 patients who were not treated with emergency reperfusion, 5 were treated with elective coronary bypass grafting, 2 with mechanical support with an intracorporal balloon pump, and 1 with conservative therapy only. All 8 survived; 6 had collaterals from the right coronary artery and the other two had no

Fig.5. Postoperative electrocardiogram showing slight terminal inversion of T waves in leads V1 to V3 and inversion of T waves with Q in I and aVL.

collaterals and severe left ventricular impairment\textsuperscript{13,17}.

Because of extensive myocardial infarction, left ventricular function is severely impaired in most survivors. The left ventricular ejection fraction in the 18 survivors ranged from 0.10 to 0.57 (mean 0.35) and was 0.50 or less in 17 of them. In our patient, postoperative SPECT and left ventricular angiographic findings indicated salvage from extensive myocardial damage with good preservation of left ventricular function. On the basis of our observations it appears that with prompt coronary reperfusion by emergent intracoronary thrombolysis and subsequent bypass surgery patients may survive with good preservation of left ventricular function. Furthermore, collaterals from the right coronary artery may be important in this regard, but were found to be insufficient in our patient.

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