Case Report

Emergency Surgical Treatment for the Total Occlusion of the Left Main Coronary Artery: A Case Report

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ABSTRACT

Background: The acute occlusion of the left main coronary artery (LMCA) in the absence of the collateral circulation is extremely rare, but it remains a catastrophic and mostly fatal entity due to myocardial infarction with severe cardiogenic shock and arrhythmias.

Methods: We evaluated 2 patients with an acute or acutely evolving occlusion of the LMCA undergoing coronary artery bypass grafting (CABG).

Results: The in-hospital mortality rate was 50%. Revascularization was achieved with on-pump CABG in both patients.

Conclusions: The total occlusion of the LMCA represents a unique clinical condition. The LMCA occlusion with shock is regarded as a class I_A indication for acute surgical revascularization. Nonetheless, emergent percutaneous coronary intervention (PCI) may be an effective method to acutely revascularize these patients. Additionally, aggressive post-PCI care—including intra-aortic balloon pumps, extracorporeal membrane oxygenation, CABG, and ventricular support devices—may be required to improve patient survival. ***(Iranian heart Journal 2018; 19(3): 64- 67)***

KEYWORDS: Left main coronary artery obstruction, Myocardial infarction, Cardiogenic shock, Early revascularization, Coronary artery bypass surgery

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The total occlusion of the left main coronary artery (LMCA) due to atherosclerosis is an unusual entity. [1] The significant disease (>50% narrowing) of the LMCA has been reported in about 5% of patients undergoing coronary arteriography, while the prevalence of the total LMCA occlusion is between 0.04% and 0.067% in patients undergoing angiography [1, 2] and 0.76% in patients undergoing revascularization

surgery. [3] The total LMCA occlusion can be either acute or chronic, [8] and its prognostic determinants are dependent on coexisting intercollaterals, a dominant right coronary artery (RCA), and the rapid establishment of complete reperfusion. [5]

We herein describe 2 surgically treated patients who survived the total LMCA occlusion, which appeared to have been acute or acutely evolving.

CASE PRESENTATION

Case 1

An 80-year-old man was admitted to our hospital with severe chest pain of 5 hours' duration. The patient's risk factors for atherosclerotic heart disease included an adult onset of diabetes mellitus, which was controlled with medical treatment. The physical examination revealed a blood pressure of 88/63 mm Hg and a pulse rate of 51 beats per minute. The electrocardiogram (ECG) showed ST-segment depression in the inferolateral leads. A bedside transthoracic echocardiographic examination showed akinetic apex and septum without significant valvular pathology and with a left ventricular ejection fraction of 40%. The chest X-ray and routine laboratory tests were normal. In particular, the initial quantitative troponin test and the MB creatine kinase level (14 ng/mL) were normal on admission. However, within a 3-hour period, the patient's angina pectoris continued and he developed symptoms and signs of cardiogenic shock. The ECG revealed ST-segment elevations in the aVL, aVR, V_1, and V_2. As a result, he was administered 300 mg of oral aspirin (chewed) and 600 mg of oral clopidogrel just prior to angiography.

Coronary angiography was performed immediately via the Judkins technique. It demonstrated the total occlusion of the proximal LMCA with no antegrade filling. The RCA was dominant and normal. There was no retrograde filling of both the left anterior descending artery (LAD) and the left circumflex (LC_X) systems from the RCA. These angiographic findings did not tally with the patient's symptoms (Fig. 1 and 2).

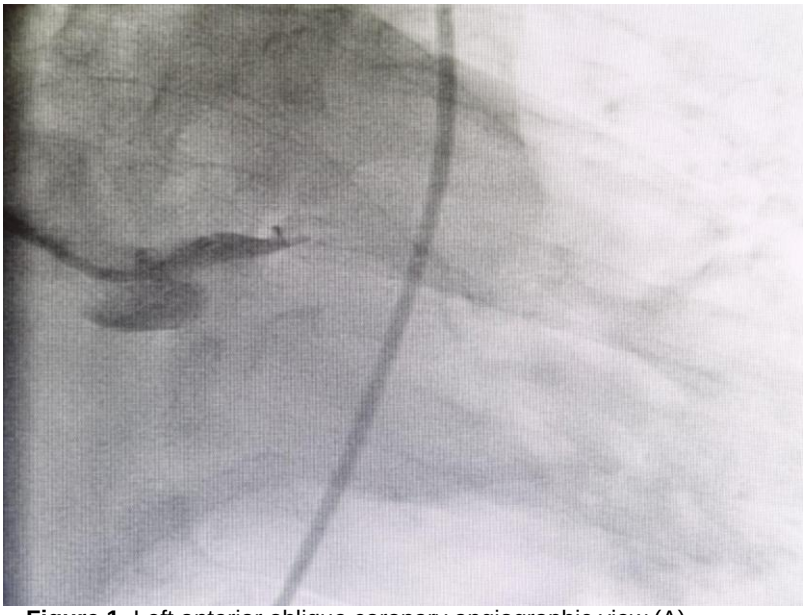

Figure 1. Left anterior oblique coronary angiographic view (A), showing the total occlusion of the proximal left main coronary artery with no antegrade filling

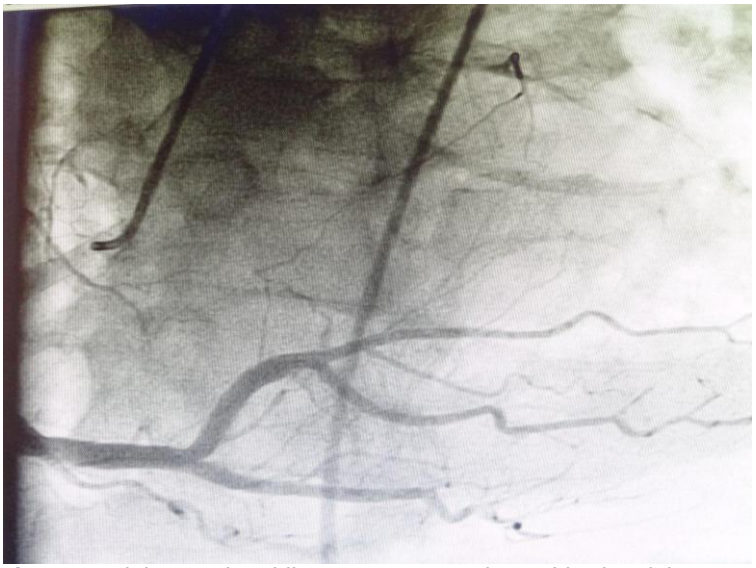

Figure 2. Right anterior oblique coronary angiographic view (A), showing that the right coronary artery is dominant and normal with collateral arteries

After catheterization, the patient was taken immediately to the operating room, where 2 bypass grafts were placed. CABG was performed with cardiopulmonary bypass machine support (on-pump). The left internal descending artery was anastomosed to the LAD and a saphenous vein graft was anastomosed to the LC_X. Antegrade and retrograde cardioplegia was used for a better myocardial protection. The patient's postoperative course was difficult, and he needed inotropic support and an intra-aortic balloon pump (IABP) for the first 72 hours. At about 3 months postoperatively, he was asymptomatic and still taking medications.

Case 2

A 52-year-old man was admitted to our cardiac service with severe angina of 4 hours' duration and a loss of consciousness (obtundation). The patient had no risk factors for atherosclerotic heart disease in his medical history.

The physical examination revealed a blood pressure of 83/60 mm Hg and a pulse rate of 130 beats per minute. The ECG showed ST-segment and T-wave changes in the leads I, aVL, and V_{1-4}, which represented an acute anterolateral myocardial infarction. A bedside echocardiographic examination showed severe akinesia in the anterior wall, apex, and septum with a moderate mitral regurgitation and a left ventricular ejection fraction of about 10%. The routine laboratory tests were normal. The initial troponin test and the MB creatine kinase level were elevated on admission.

With a diagnosis of cardiogenic shock, the patient was administered 300 mg of oral aspirin (chewed) and 600 mg of oral clopidogrel just prior to percutaneous coronary intervention (PCI).

An IABP was inserted in the femoral artery for hemodynamic support. Coronary angiography was performed immediately, and it demonstrated the total occlusion of the proximal LMCA with no antegrade filling. The RCA was dominant and had a distal significant lesion. There was no retrograde filling of both the LAD and LC_X systems from the RCA. The angiographic findings did not match the patient's symptoms. After catheterization, he was transferred immediately to the operating room, where 3 bypass grafts were placed. CABG was performed with cardiopulmonary bypass machine support (on-pump). A saphenous vein graft was anastomosed to the LAD, the LC_X, and the RCA. Antegrade and retrograde cardioplegia was used for a better myocardial protection. The patient's postoperative course was difficult, and he

needed inotropic support and an IABP. Eventually, he died with symptoms of the low cardiac output syndrome 48 hours after the operation.

CONCLUSIONS

The total occlusion of the LMCA represents a unique clinical condition, the development of which is attributed to certain acute and chronic pathologic processes or to iatrogenic factors relating to mechanical manipulations in the LMCA. The symptoms correspond to the presence and the quality of the collateral vessels, associated myocardial damage, and impaired hemodynamics. Although emergent PCI may be an effective method to acutely revascularize this subset of patients, aggressive post-PCI care—including IABPs, extracorporeal membrane oxygenation, CABG, and ventricular support devices—may be required to enhance patient survival.

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