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CASE REPORT

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Complicated acute myocardial infarction with simultaneous occlusion of two coronary arteries

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Abstract

Simultaneous occlusion of two coronary arteries in acute MI is infrequent and may be accompanied by cardiogenic shock. Prompt restoration of normal coronary flow can salvage the myocardium and decrease a possible risk of death from complications.

KEYWORDS

acute myocardial infarction, cardiogenic shock, percutaneous coronary intervention, simultaneous coronary occlusion

1 | INTRODUCTION

A 68-year-old man presented with STEMI complicated by cardiogenic shock and CAVB. Emergency coronarography revealed a simultaneous occlusion of two coronaries. PPCI was successfully performed in both infarct-related arteries. After the intervention, a significant improvement of the patient's condition was observed. He was discharged without signs of CHF.

Simultaneous occlusion of multiple coronary arteries is rare in patients presenting with ST-segment elevation myocardial infarction (STEMI). Clinical presentation can be complicated by cardiogenic shock or sudden cardiac death (SCD). The mechanism is most probably related to

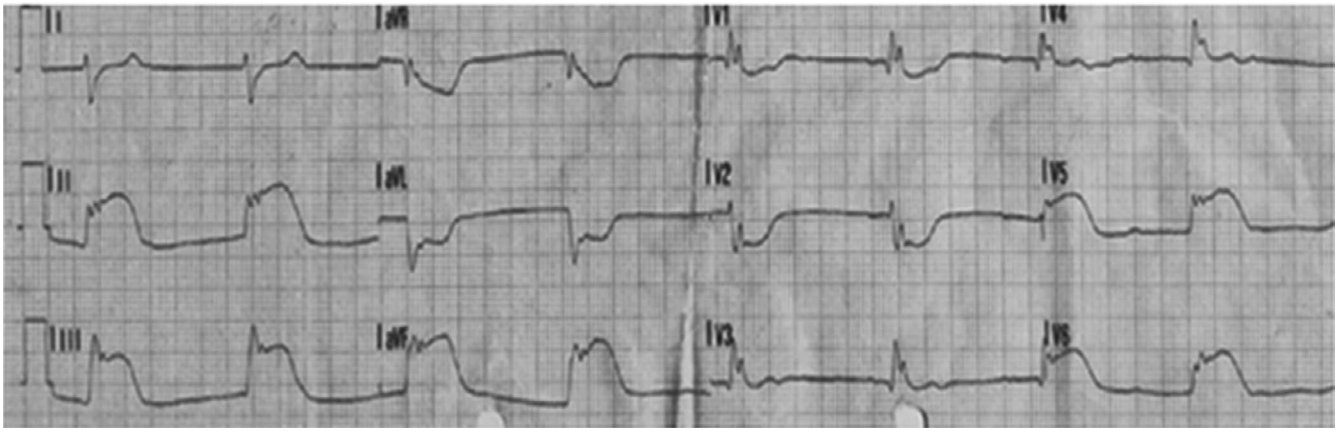

FIGURE 1 ECG on admission showed CAVB and ST-segment elevation in II, III, aVF, and V5-V6

vulnerable coronary plaques.[1-4] We presented the case of a man with acute inferolateral STEMI caused by simultaneous thrombosis of two major coronary arteries complicated by cardiogenic shock and complete AV block (CAVB).

2 | CASE REPORT

A 68-year-old previously healthy man was transferred to our department with acute STEMI 1.5 hours after beginning of chest pain. His risk factors for coronary artery disease were smoking and age. On admission, the patient was restless and sweating. His heart rate was regular 56 beats/min, blood pressure 79/56 mm Hg, and saturation 74% without oxygen. Physical examination revealed fine rales over the basal field of lungs and cool extremities with cyanosis. ECG showed CAVB and ST-segment elevation in leads II, III, aVF, and V5-V6 (Figure 1).

Emergency coronary angiography revealed a total occlusion of the ostial LCx artery with thrombus and a total occlusion of the proximal Right Coronary Artery (RCA) (Figure 2).

As a visible thrombus was located in the ostial LCx artery, this lesion was firstly treated with predilatation and deployment of a 3 × 18 mm (Ultimaster™, Terumo) drug-eluting stent (DES). A change in the patient's condition was not observed. The lesion in the RCA was crossed by a guidewire as easily and

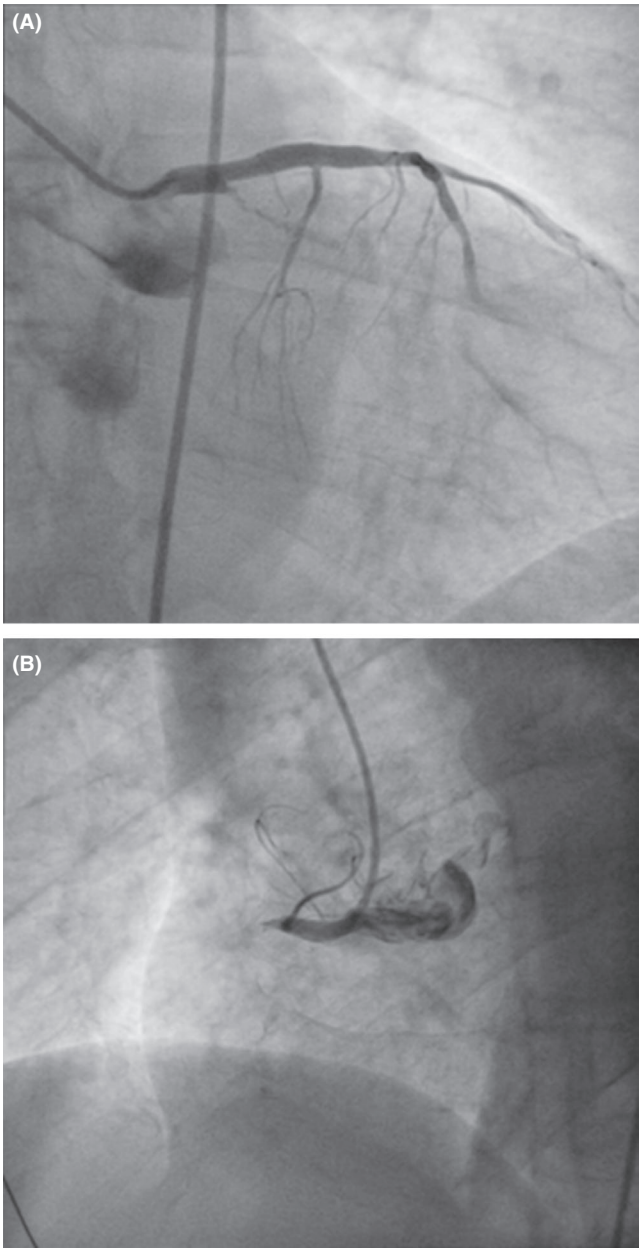

FIGURE 2 A, Total occlusion of the ostium LCx artery. B, Total occlusion of the proximal RCA

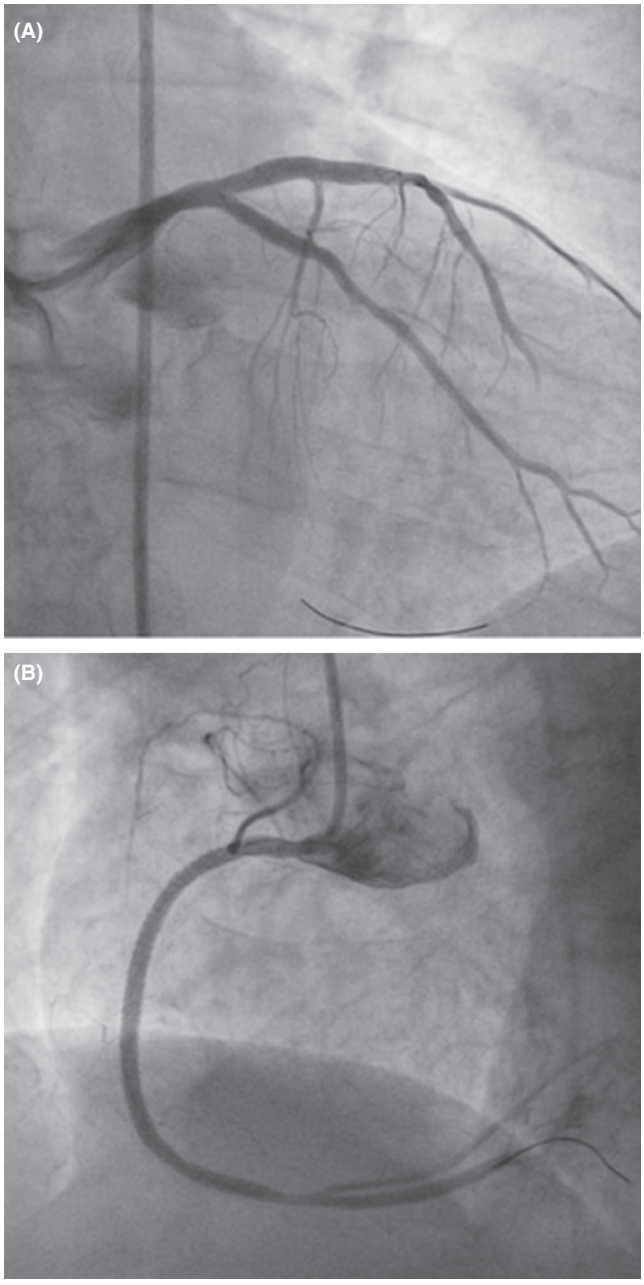

FIGURE 3 A, The final angiographic result of the LCx artery. B, The final angiographic result of the RCA

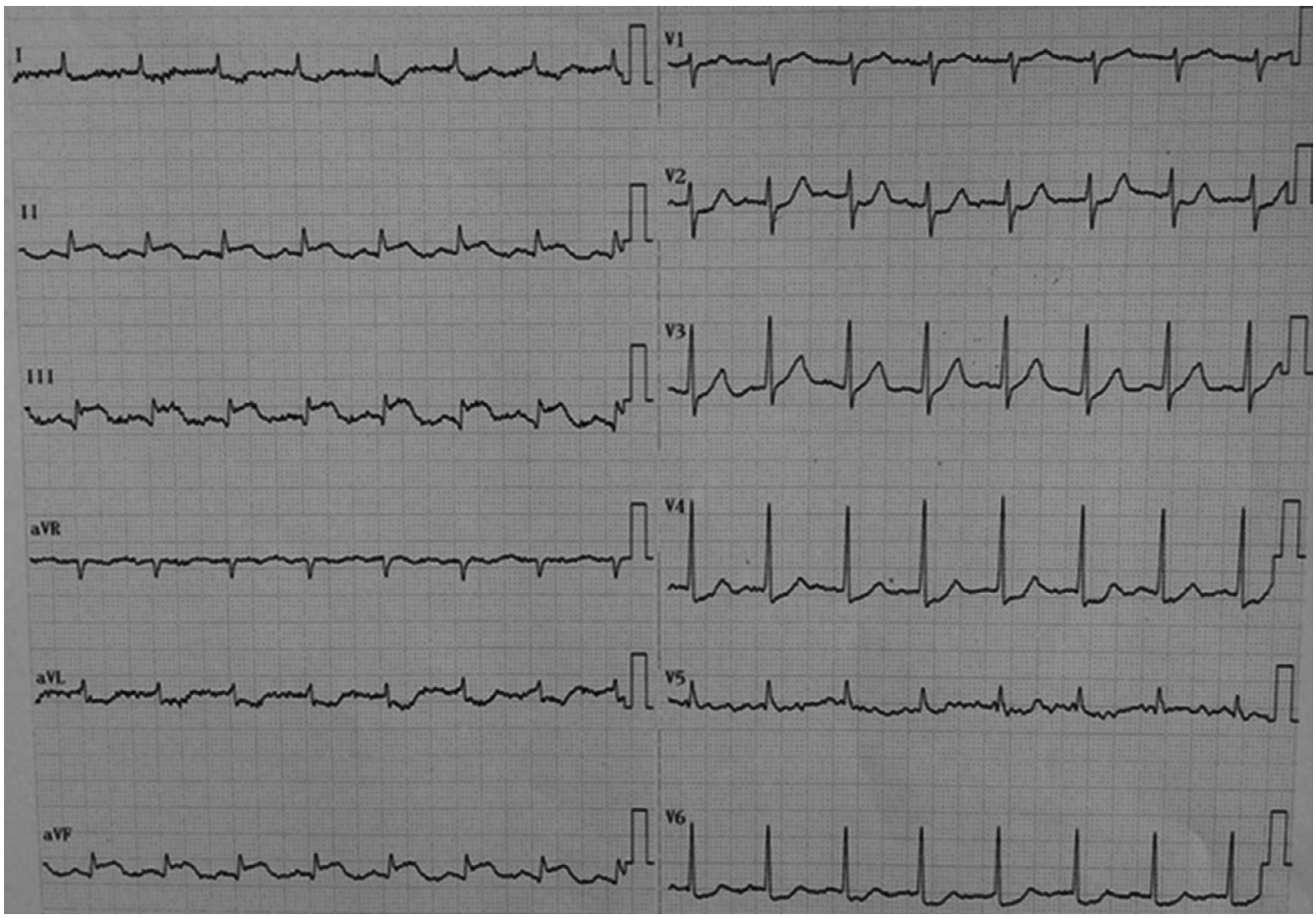

FIGURE 4 ECG after intervention

smoothly as in LCx artery. A 3 × 33 mm DES (Xience V®, Abbot) was implanted at the culprit lesion and an additional 3 × 23 mm DES (Xience V®, Abbot) was deployed in the middle part of the RCA due to the significant narrowing that became visible after implantation of the previous stent. Normal coronary blood flow restored (Figure 3) in the RCA. At this stage, the clinical condition and hemodynamic state of the patient significantly improved. Finally, PPCI of both affected vessels was performed with placement of DESs. After the procedure, ECG showed normal sinus rhythm, CAVB resolved, and ST-segment elevation significantly decreased (Figure 4).

Echocardiography revealed a moderate decrease in the left ventricular function with a mean ejection fraction of 35%.

On day six, the patient was discharged in good medical condition without signs of congestive heart failure (CHF).

3 | DISCUSSION

The rupture of the vulnerable coronary plaque with subsequent thrombus formation and vessel occlusion is the main mechanisms of acute STEMI.[1] Usually it is recognized by a single-culprit lesion; however, in rare cases, multivessel coronary artery occlusion may occur at the same time in patients with acute MI.[2,3] Most patients with simultaneous coronary artery occlusion are in critical condition and may present with cardiogenic shock or SCD.[4] The mechanism of multivessel coronary artery thrombosis remains unclear but different contributing factors could be suggested such as a hypercoagulable state, cocaine use, or an essential thrombocytosis.[2] None of these factors were present in our patient; however, he was elderly and a smoker. Smoking may increase arterial wall stiffness, the risk for plaque rupture, and subsequent MI.[5] In acute MI, inflammation of the pancoronary vessels may occur predisposing to plaque instability and thrombosis in multivessel coronary arteries.[6]

Our patient was admitted with acute inferolateral STEMI, complicated by cardiogenic shock and CAVB. Because these complications, an intra-aortic balloon pump (IABP) or even other mechanical circulatory support devices may be necessary. Routine insertion of IABP is not indicated in cardiogenic shock.[7] TandemHeart or Impella use is not associated with increased survival in patients with cardiogenic shock. VA-ECMO had been applied in patients with more severe cardiopulmonary failure.[8] In the case of cardiogenic shock due to acute STEMI, myocardial revascularization is the

only evidence-based therapy with proven survival benefit.[9] Considering all those options, we concluded that for our patient the best choice is PPCI.

Coronary angiography revealed occlusion of ostial LCx artery and proximal RCA. It was not clear what the culprit lesion is. ECG finding on admission was not helpful to recognize the infarct-related artery. Due to a visible thrombus in ostial LCx artery, it was firstly decided to open this artery with restoration of TIMI 3 flow without using the aspiration thrombectomy. Based on published guidelines, aspiration thrombectomy is not routinely needed in PPCI.[7] After normalization of coronary flow in both occluded coronary arteries, the clinical and hemodynamic condition of our patient was significantly improved.

The incidence of CAVB complicating STEMI is associated with worse outcome, and a temporal pacing may be indicated. In inferior STEMI, CAVB is usually supra-Hisian in origin and may be related to AV nodal ischemia. Temporal pacemaker insertion is not a benign procedure in the setting of acute STEMI. It can delay PPCI, may be fraught with complications, including ventricular fibrillation and cardiac perforation, and even associated with an increased risk of in-hospital death.[10]

During the intervention, we hesitated whether to place or not a temporal pacemaker. We assumed that CAVB resulted from acute myocardial ischemia and fast restoration of a coronary flow should improve it. Indeed, shortly after PPCI of both infarct-related arteries, the conduction disturbance was resolved.

In this rare case, we first described a patient with complicated acute inferolateral STEMI due to very proximally simultaneous thrombotic occlusion of LCx artery and RCA. Prompt intervention in both occluded coronary arteries and restoration of normal coronary flow was the best therapy for this patient, myocardium was salvaged, and possible risk of death from complications was decreased.

4 | CONCLUSION

Prompt PPCI of affected vessels in complicated acute STEMI is an effective therapy for treating patient with simultaneous occlusion of coronary arteries allowing to salvage the myocardium and to improve clinical prognosis.

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Irina Nordkin MD, MHA: performed the procedure and wrote the manuscript. Alexander Goldberg MD: revised the manuscript. Zeev Israeli MD: revised the manuscript. Majdi Halabi MD: performed the procedure and wrote the manuscript.

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