Life-Saving PCI Leading to Successful CPR

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Abstract

Effective cardiopulmonary resuscitation (CPR) can sufficiently preserve vital organs even during prolonged cardiac arrest. In the setting of acute myocardial infarction, accurate and wise strategy, including primary percutaneous coronary intervention (PCI) of the culprit lesion can be life-saving, even if complicated by prolonged cardiac arrest unresponsive to CPR.

We describe the case of a 53-year-old man who was successfully managed after prolonged refractory cardiac arrest following acute myocardial infarction ***(Iranian Heart Journal 2009; 10 (2):37-39).***

Key words: cardiopulmonary arrest ■ primary percutaneous coronary intervention ■ cardiopulmonary resuscitation

A timely restoration of antegrade coronary blood flow in the infarct-related artery of a patient with acute myocardial infarction (AMI) results in myocardial salvage and improved survival[1,2] Given the superior safety and efficacy of primary percutaneous coronary intervention (PCI), this treatment is now preferred when logistics allow this approach.

Case report

A 53-year-old man was referred to our hospital with prolonged chest pain and fainting following exercise tolerance test in a private outpatient medical center. Review of the past medical history revealed a strong family history of ischemic heart disease, active heavy smoking, dyslipidemia, and typical exertional chest pain commencing two weeks previously. At first glance, he was restless, pale, and diaphoretic. On physical examination, distended neck veins, tachycardia (HR=110/m), mild tachypnea, and blood pressure of 150/95 mmHg were evident. Heart sounds were muffled but no murmur was heard. On lung examination, moist basilar rales were detectable.

Electrocardiography showed sinus tachycardia, ST-segment elevation in leads II, III, aVf, V3-5R, and V7-9, and ST-segment depression in leads I and aVL.

Transthoracic echocardiography showed severe left ventricular systolic dysfunction with estimated ejection fraction (EF) of about 10%.

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Several minutes after arrival, the patient went into ventricular fibrillation and loss of consciousness. Immediately, multiple attempts at electrical defibrillation were made, which were unsuccessful due to refractory ventricular fibrillation.

The patient was immediately intubated, and cardiopulmonary resuscitation (CPR) was continued for about ***seventy*** minutes. During this period, drugs such as lidocaine, amiodarone, bretylium, calcium chloride, and sodium bicarbonate were administered, but eventually cardiac asystole occurred.

A temporary transvenous pacemaker lead was inserted via the subclavian venous approach and the patient was transferred to the catheterization unit for emergency coronary angiography under cardiac massage and mechanical ventilation.

Right coronary angiography revealed a thrombotic totally occlusive lesion of the proximal right coronary artery (RCA, Fig.1).

The 0.014 inch guiding wire crossed the lesion; and after pre-dilatation, the occluded RCA was stented with two bare metal stents (4×28 and 4×22) successfully, which restored the RCA blood flow (Fig. 2).

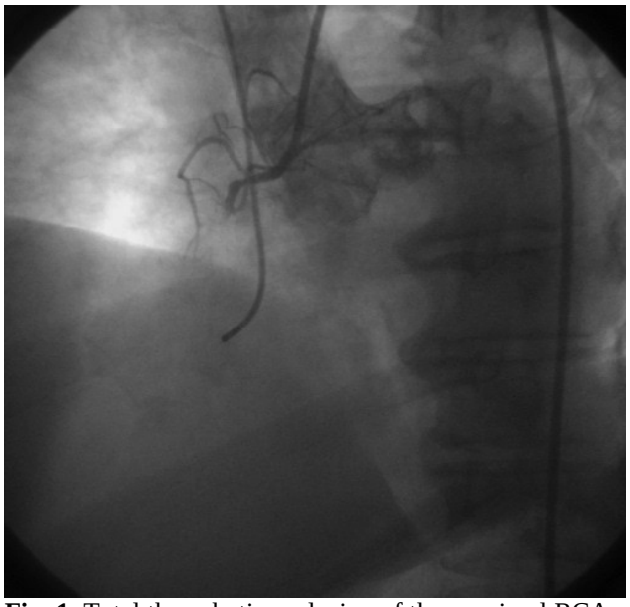

Fig. 1. Total thrombotic occlusion of the proximal RCA.

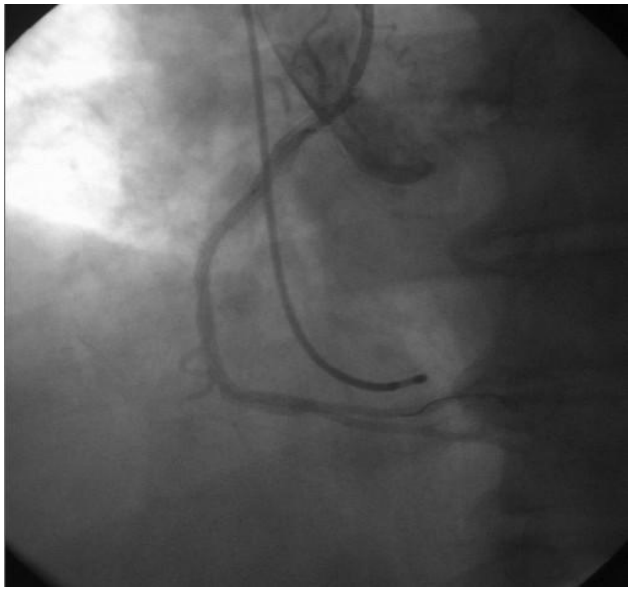

Fig. 2. Successful restoration of flow post-stenting of the RCA

Thereafter, the patient developed junctional rhythm and his blood pressure increased gradually and he responded to ventricular pacing.

After the insertion of an intra-aortic balloon pump (IABP), left coronary angiography was performed and showed total occlusion of the proximal left anterior descending (LAD) and left circumflex (LCX) arteries (Fig. 3).

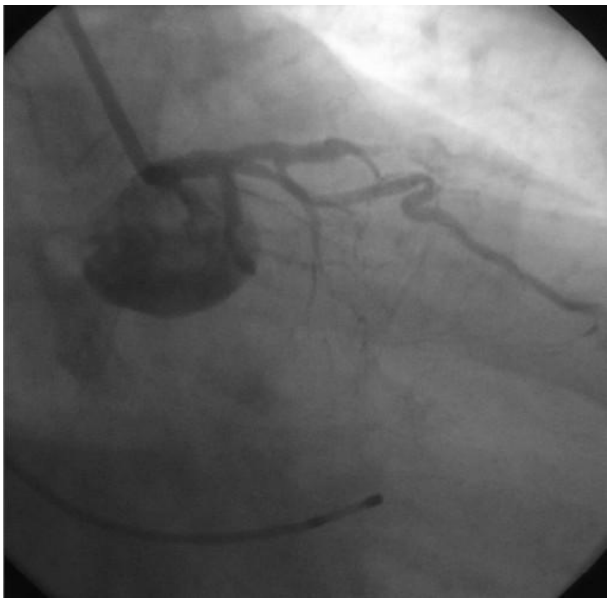

Fig. 3. Left coronary angiogram showing total occlusion of the LAD and LCX arteries

After hemodynamic stabilization, the patient was transferred to the operating room. Emergency coronary artery bypass graft surgery was performed and saphenous veins were grafted to the LAD and OM vessels. After 48 hours, the patient was weaned successfully from the mechanical ventilator and IABP, with gradual improvement of cognitive and neurological status. During the hospital course, no ischemic, respiratory, renal, or neurological complications occurred and the patient achieved a suitable level of functional capacity beyond the first week. Finally the patient was discharged in good condition and has had an uncomplicated follow-up since.

Discussion

Several concepts have been proposed for primary PCI and our experience showed their utility. PCI can be life-saving in the setting of AMI, even if complicated by prolonged cardiac arrest unresponsive to CPR.

Mechanical reperfusion therapy has recently been accepted as the preferred reperfusion strategy for ST-segment elevation myocardial infarction. The greatest absolute benefit occurs in patients at highest risk, and several randomized trials have specifically evaluated these high-risk subgroups.

The SHOCK trial (SHould we emergently revascularize Occluded Coronaries for cardiogenic shocK), which randomized 302 patients with cardiogenic shock to emergency revascularization versus medical stabilization, found lower mortality with emergency revascularization at 6 months (50% vs. 63%; P-value=0.03).[3]

In the setting of acute myocardial infarction, it is mandatory to consider the culprit artery as the primary goal of intervention, because dilating a non-infarct artery might place too much myocardium in jeopardy acutely. Although more recently, with the availability of stents and with the recognition of rupture of multiple plaques in the setting of AMI, PCI of more than one vessel is sometimes performed. Of note, in patients with cardiogenic shock, if shock remains refractory after treatment with IABP and PCI of the infarct lesion, PCI of a critical lesion in a second or third vessel may sometimes provide hemodynamic improvement.[4,5]

Effective CPR will provide sufficient levels of vital organ perfusion (e.g. brain) for even more than one hour, allowing for further interventions to be considered for the patient.

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