

Case Reports: A 24-Hour Recovery of Left Ventricular Function After Complete Revascularization in NSTEMI Patient

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Abstract

Complete revascularization in ST-elevation myocardial infarction (STEMI) patients may improve the left ventricular (LV) function and clinical outcome. However, a limited data about the comparison between the complete versus culprit approach, evaluation of early and long-term prognosis including LV function post-percutaneous coronary intervention (PCI) in NSTEMI. We present a case of early recovery (within 24 hours) of the LV function in a patient with NSTEMI who underwent complete revascularization.

Keywords: Non-ST Elevation Myocardial Infarction; Ejection Fraction; Speckle Tracking Echocardiography

Abbreviations

STEMI: ST-Elevation Myocardial Infarction; NSTEMI: Non-ST Elevation Myocardial Infarction; LV: Left Ventricular; EF: Ejection; Fraction; PCI: Percutaneous Coronary Intervention

Introduction

Assessment of LV function is widely used for many risk scores and therapeutic guidelines [1,2]. Most cardiac ischemic patients have considerable diversity in LV function regarding the impact of acute coronary syndrome on the EF (Segmental wall abnormalities and deformation), which detected early by 2D speckle-tracking and other advanced non-invasive modalities [3,4].

Unlike STEMI, few randomized trials studied infarct-related artery (IRA) versus complete revascularization in NSTEMI patients with multivessel disease regarding efficacy, safety, as well short and long-term outcomes based on ejection fraction [5]. In this case, we study the impact of complete revascularization on early LV function recovery (within 24 hours) in patients with NSTEMI.

Case Presentation

A 76-year-old woman. She was known to have hypertension, diabetes mellitus, and hypothyroidism. Presented to our emergency department with a clinical presentation suggestive of high-risk NSTEMI. The pre-cath echo showed EF 30% akinetic preserved thickening of mid-apical anterior & inferior-posterior wall hypokinesia (Figure 1a).

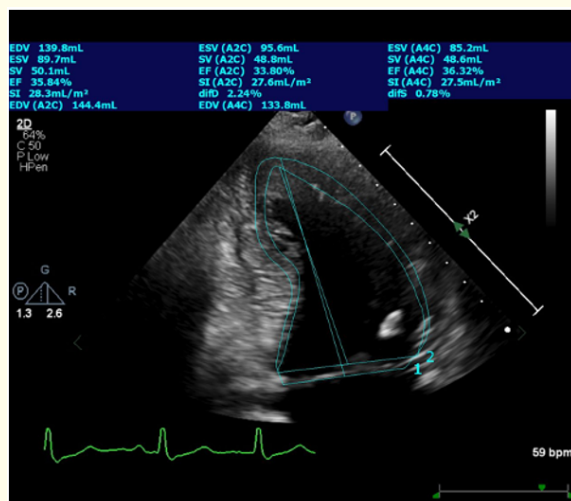


Figure 1a: ECHO (Pre-PCI) 2D two chamber view of LV calculating EF with Simpson method.

She underwent a coronary angiogram, which revealed: a normal left main coronary artery, left anterior descending artery (LAD) tubular long lesion proximal LAD 20%, Mid LAD tight 90% bifurcation lesion DII (Medina III Circumflex proximal tight lesion bifurcation to the left marginal artery “OMI” (Medina III) OMI 85% and mid-Left circumflex artery 70%, the right coronary artery (RCA) is small with no-significant disease.

The patient underwent complete percutaneous revascularization with one drug-eluting stent to the LAD, a double kissing (DK)-crush technique to proximal LCX-OMI, and one drug-eluting stent to mid LCX.

A standard echocardiographic study done within 24 hours post PCI procedure showed EF= 49%, consistent with Global Longitudinal Strain (Figure 1b).

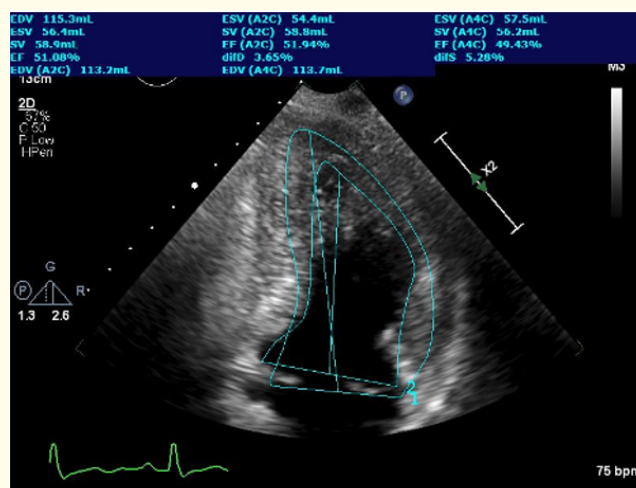


Figure 1b: ECHO (Pre-PCI) 2D two chamber view of LV calculating EF with Simpson method.

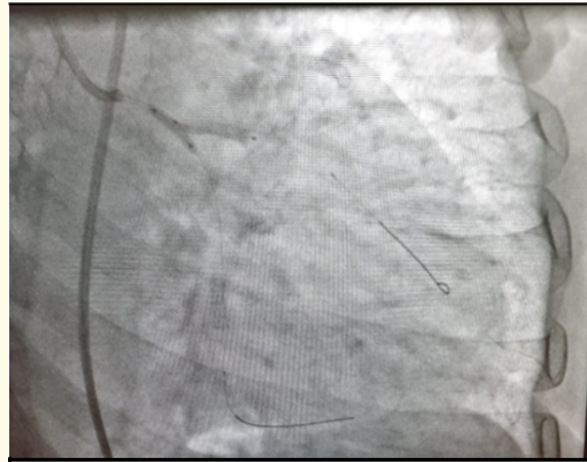


Figure 2: RAO caudal view showing final kissing in DK-crush to LCX-OM1.

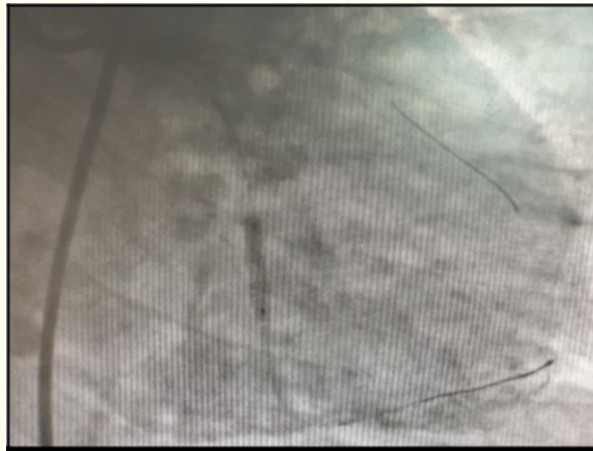


Figure 3: RAO caudal view showing stent deployment in mid LCX.

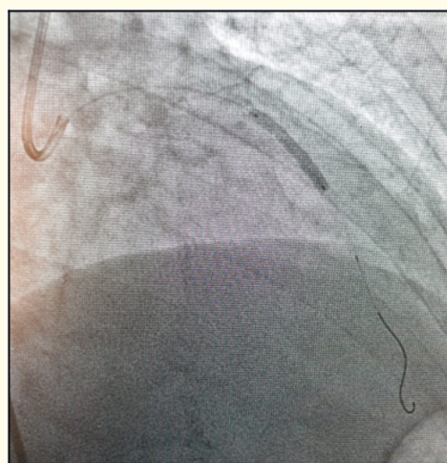


Figure 4: RAO caudal view showing stent deployment in mid LCX.



Figure 5: Bull's eye spot for LV GLS (global longitudinal strain).

Discussion

Unlike STEMI, few randomized trials studied the complete versus IRA only revascularization in NSTEMI patients. However, from data interpretation, complete revascularization is known to result in rapid and early segmental LV function improvement in patients with disturbed function under controlled conditions, irrespective of the acuity of presentation [5,6]. This case demonstrates that improvement of LV function measured by ejection fraction (EF) in patients with NSTEMI who underwent complete revascularization could be detected early (within 24 hours) post-PCI.

Recovery of LV function in coronary artery disease depends on viable tissue in either stunned or hibernating myocardium in which blood supply restore by revascularization. Improvement of LV function results when hibernating myocardium restores the contractile function when revascularization is achieved.

Our patient's better LV function improvements were observed in Ejection fraction, regional wall motion, and deformation parameters detected by Echocardiographic global longitudinal strain (GLS). The more significant improvement of basal and apical regional deformation related to the two tight lesions on LAD, the complete revascularization (culprit and non-culprit lesions) in the proximal part of dominant left coronary systems has a complementary effect on this result. The importance of revascularization of the proximal lesions, irrespective of the artery involved, in improving the basal LV function was reflected widely in clinical outcomes. In one study, the regional strain and strain rate (SR) increased within three days of PCI and researchers saw the highest accuracy in patients with multivessel CAD [7]. In comparison, our patient had a similar response pattern but differed in rapidity (within 24-hour) for all parameters (LV function, deformation, regional wall motion and EF).

This response cannot be explained only by the patient's quick attendance to the hospital without also the pathophysiology of ACS-NSTEMI, which has partial occlusion of the vessel that maintains blood supply to the tissues.

Clinical implication

Complete revascularization in NSTEMI, whenever it is possible, could provide promising results regarding short-term prognosis, including improvement in LV function. Further studies in this area are needed.

Conclusion

In NSTEMI patients, recovery of LV function could be detected early within the first 24-hours after complete revascularization of coronary artery disease.

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