



International Journal of Cardiovascular Diseases & Diagnosis

Case Report

Double Territory Myocardial Infarction by Occlusion of Single Coronary Artery, Wrapped Left Anterior Descending Coronary Artery Phenomenon - Ⓜ

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Submitted: 26 August 2017; **Approved:** 08 September 2017; **Published:** 11 September 2017

Citation this article: Wassam el din Hadad Elshafey. Double Territory Myocardial Infarction by Occlusion of Single Coronary Artery, Wrapped Left Anterior Descending Coronary Artery Phenomenon. Int J Cardiovasc Dis Diagn. 2017;2(1): 033-035.

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INTRODUCTION

Acute occlusion of the Left Anterior Descending Coronary Artery (LAD) generally results in ST segment elevations in precordial leads and reciprocal ST segment depression in inferior leads. When ST segment elevation occurs in inferior leads, the culprit artery is either the Right Coronary Artery (RCA) or Left Circumflex Coronary Artery (LCX). Simultaneous anterior and inferior myocardial infarction has been described due to occlusion of “wrapped LAD” [1]. The occurrence of isolated inferior myocardial infarction due to occlusion of LAD is unknown. Here we describe an isolated acute inferior myocardial infarction due to occlusion of LAD which continues as the Posterior Descending Coronary Artery (PDA).

CASE REPORT

A 43-year-old male presented to our emergency department with severe crushing chest pain of 2-hour duration, the pain was retrosternal, crushing, and associated with profuse sweating. There was breathlessness, nausea, and vomiting. 3 days before, this pain was started and continued for several hours with the same characters but gets off. He did not have any risk factors for coronary artery disease except he is very heavy cigarette smoker. Initial ECG in the emergency room showed ST segment elevation in leads II, III, AVF, I, and V1-V6 and Q waves in V1-6, ST segment depression in AVR, there was no right ventricular involvement or any conduction disturbances (Figure 1).

On physical examination, his blood pressure was 100/60 mmHg and heart rate was 126/minute, and there was lung congestion on back examination, No pericardial rub and no other abnormal findings on physical examination.

The patient was administered Aspirin 300 mg orally and clopidogrel 600 mg orally, and prepared to do Primary PCI, 10,000 IU of unfractionated heparin IV was given, Coronary angiography showed left dominant system. Right coronary artery was small, non-dominant and ends by supplying the right ventricular branches. Left circumflex artery was large vessel and gave rise to two large obtuse marginal branches one of which supplies the postero-lateral territory. LAD was a large vessel giving 2 big diagonals then abruptly occluded with no ante grade filling. (Figure 2).

The lesion was crossed with PT2 MS guide wire and predilated with Maverick 2.5 × 20 mm balloons. The lesion was stented with DES 3.5 × 28 mm but there was a resistant thrombosis even after giving intracoronary tirofiban the lesion was fixed by overlapping DES 2.75×38 stent at 16 atmospheres. Post deployment angiography showed good result with TIMI III flow and no residual stenosis, what was surprising that the LAD was long wrapped around apex giving posterior descending artery and that was the culprit lesion of inferior MI. (Figure3).

DISCUSSION

Acute inferior wall myocardial infarction is usually due to occlusion of the RCA and is rarely due to occlusion of LCX. Several ECG criteria have been developed to differentiate the culprit lesion in the setting of acute inferior wall Myocardial Infarction (MI). Simultaneous anterior and inferior myocardial infarction due to distal LAD occlusion have been described, but isolated inferior wall infarction due to LAD occlusion is rarely reported. In our case, this was due to unusual anatomy where long wrapped LAD continues to form the PDA which supplied most of the inferior wall.

A “wrapped LAD” is defined as a LAD from a post-reperfusion coronary angiogram that perfuse at least one-fourth of the inferior wall of the left ventricle in the right anterior oblique projection [2]. If the patient has a wrapped LAD and the location of the occlusion is proximal to D1, ST is elevated in anterior leads and remains isoelectric in the inferior leads. If the patient has a wrapped LAD and location of the occlusion is distal to D1, ST segment is elevated in anterior and inferior leads simultaneously [1]. Our case was an unusual variety of wrapped LADs where the entire posterior descending artery was formed by continuation of the distal LAD. The occlusion was distal to 2nd diagonal branches and hence resulted in isolated inferior wall MI after the first anterior septal MI. Continuation of the left anterior descending coronary artery to form the posterior descending artery is rare coronary anomaly [3]. Clark et al. [4] identified a patient in whom LAD formed the PDA and terminated just before the crux.

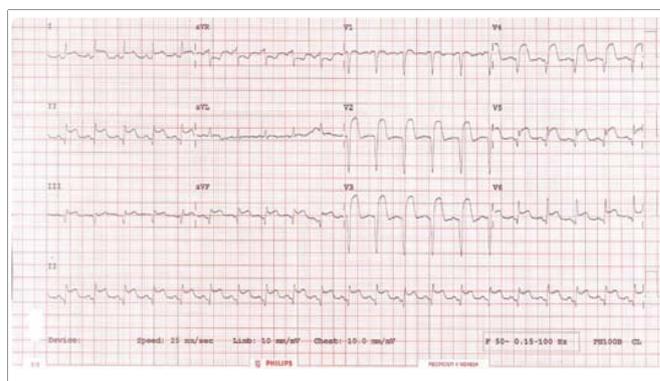


Figure 1: 12 Lead ECG, showed sinus tachycardia with acute ST segment elevation in leads I, II, III, AVF and V1-V6, Q wave in V1-V6, ST segment depression in AVR.

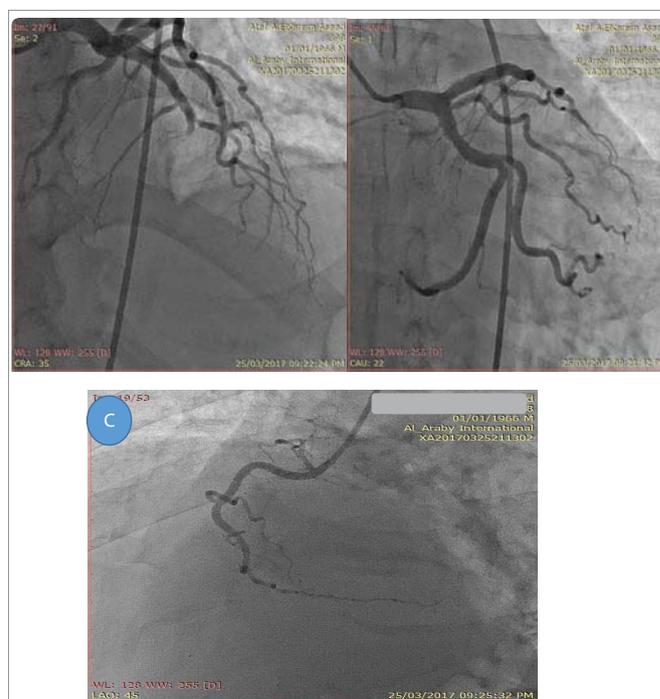


Figure 2: Coronary angiogram showed.
A: Totally occluded LAD artery after giving 2 big diagonal branches
B: Big normal LCX artery with 2 big obtuse marginal branches.
C: Small non dominant normal RCA.



Figure 3: Revascularized Wrapped LAD with 2 DES with posterior extension of the LAD to supply the PDA.

Akdemir et al. [5], described a patient with acute anterior and inferior wall myocardial infarction due to occlusion of the wrapped LAD. The patient's angiogram showed wrapped LAD with proximal and distal LAD lesions. Anterior ST segment elevation returned to isoelectric line after primary direct stenting to proximal LAD, but the inferior ST segment elevation persisted due to distal LAD lesion at the apex which could not be crossed with the guide wire.

Our case describes a rare form of left dominant coronary circulation in which LAD wraps around the apex forming posterior

descending coronary artery. This has resulted in isolated inferior wall myocardial infarction due to distal LAD occlusion. Physicians and cardiac surgeons should be aware of such a variant as it has considerable impact on the clinical course due to large area of myocardium in jeopardy if the occlusion occurs in such a LAD [6].

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