

Fatal derecruitment of occluded left anterior descending collaterals after left circumflex revascularization



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Coronary arteries are not definitely functionally terminal arteries, as previously thought; indeed, they are linked and interconnected by a rich network of collaterals. Chronic total occlusions (CTOs) represent a subset of frequent lesions encountered in everyday catheterization laboratory practice, generally associated with a developed system of collateral connections. These latter have the capacity to prevent myocardial necrosis and may even uphold metabolic supply to the ischemic territory to maintain its contractile capacity. Authors have reported a rapid and progressive reduction of collateral function and their decline after antegrade flow restoration, resulting in higher myocardial susceptibility to ischemia in the CTO territory. Here, we report the case of a fatal derecruitment of collaterals for a left anterior descending CTO not reopened, after left circumflex subocclusion revascularization.

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Keywords: Chronic total occlusion, Collateral circulation, Collateral derecruitment

Introduction

In the presence of stenosis or occlusion, coronary collaterals are able to remodel and to expand in order to insure sufficient supply for the ischemic myocardial territory [1]. Thus, they have a relevant protective role in preserving ventricular function, preventing ventricular dilation, and reducing mortality [2].

The anatomic and functional characteristics of coronary collaterals have been well investigated, particularly in the setting of chronic total occlusions (CTOs), contributing to the development of the percutaneous treatment of such lesions [3–5]. After CTO recanalization and the restoration of an antegrade flow, Zimarino et al. [6] showed the rapid *derecruitment* of collateral circulation, hence increasing the myocardial susceptibility to ischemia.

Disclosure: Authors have nothing to disclose with regard to commercial support.

Received 29 August 2015; accepted 5 September 2015.

Available online 11 September 2015

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Peer review under responsibility of King Saud University.

URL: www.ksu.edu.sa

<http://dx.doi.org/10.1016/j.jsha.2015.09.001>



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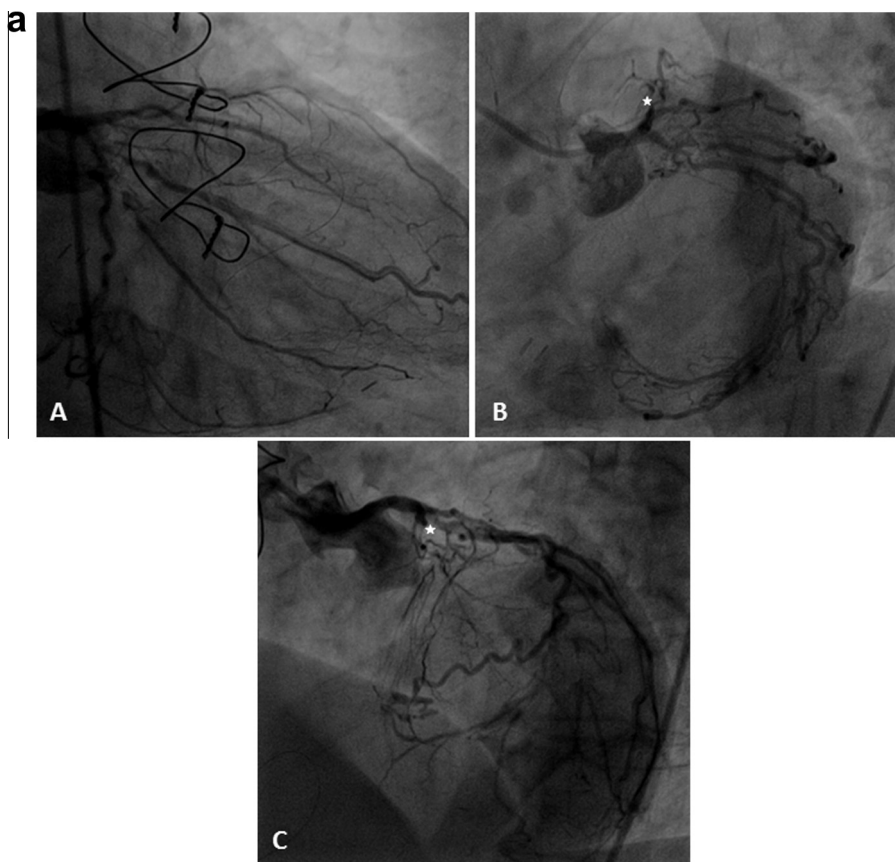


Figure 1. (A) (a) Right caudal view; (b) left caudal view; and (c) left cranial view. Left angiogram showing a proximal chronic total occlusion of LAD with septal and epicardial ipsilateral collaterals, and a co-dominant LCx with subocclusion of the ostium of OM1, OM2, and OM3. (B) Right angiogram showing a subocclusion. (a) Left view and (b) cranial view. Right angiogram showing a subocclusion of the second segment of a RCA giving septal and epicardial collaterals to LAD. (C) Control of coronary artery bypass graftings. (a) Occlusion of saphenous venous graft to RCA; (b) occlusion of left IMA to LAD; and (c) stenosis of the distal anastomosis of right IMA to OM2. IMA = internal mammary artery; LAD = left anterior descending; OM = obtus marginal; RCA = right coronary artery.

We report the case of a fatal derecruitment of an occluded left anterior descending (LAD) collaterals occurring after left circumflex (LCx) subocclusion revascularization.

Case report

A 60 year-old ex-smoker and dyslipidemic male was admitted for dyspnea class III and typical angina class III, according to New York Heart Association and the Canadian Cardiovascular Society classifications, respectively. Three months earlier, he underwent a coronary artery bypass graft intervention for a three-vessel coronary artery disease: left internal mammary artery (IMA) to LAD, right IMA to first obtus marginal (OM) and saphenous venous graft (SVG) to right coronary artery (RCA). No abnormalities were found on his chest X-ray. Transthoracic echocardiography (ECG) was performed, showing a mildly impaired left ejection fraction (50%) with

global hypokinesia. No Q wave was observed in 12-lead ECG. A coronary angiography was then indicated. The left angiogram showed a proximal CTO of LAD with septal and epicardial ipsilateral collaterals from a co-dominant LCx with subocclusion of OM1, OM2, and OM3 (Fig. 1A). The right coronary angiogram revealed a subocclusion of the second segment of a RCA giving a network of collaterals to LAD and LCx (Fig. 1B). The control of coronary artery bypass graftings revealed the occlusion of SVG to RCA, the occlusion of left IMA to LAD, and a critical stenosis at the distal anastomosis of right IMA to OM1 (Fig. 1C). The decision of the local heart team was to opt for percutaneous coronary intervention (PCI) following a two-step strategy: a first procedure with intra-aortic balloon pump support to revascularize RCA and LCx, while the second procedure would be scheduled 1 month later to attempt LAD CTO.

A double 7F femoral access was used. A PCI of the second segment of RCA with one

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