

Eccentric lesion with false lumen and multiple microchannels: diagnosis of chronic recanalized coronary thrombus using optical coherence tomography

Lesão excêntrica com falsa luz e múltiplos microcanais: diagnóstico de trombo coronariano crônico recanalizado utilizando tomografia de coerência óptica

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ABSTRACT – Optical coherence tomography is an intravascular imaging tool that has been increasingly used in the cardiac catheterization laboratory. Since its spatial resolution is approximately ten-fold greater than intracoronary ultrasound, optical coherence tomography assists in the anatomical differential diagnosis of coronary lesions with atypical presentation. In this report, we present a case of a female patient with a history of acute coronary syndrome and, currently, with a complex angiographic lesion, with the aspect of a chronic dissection in the anterior descending artery. Optical coherence tomography was the intravascular imaging method used, and the richness of detail of its images aided in the discussion of etiology of the lesion and its differential diagnoses.

Keywords: Coronary angiography; Acute coronary syndrome; Tomography, optical coherence

RESUMO – A tomografia de coerência óptica é uma ferramenta de imagem intravascular com utilização crescente no laboratório de hemodinâmica. Por apresentar resolução espacial cerca de dez vezes maior que o ultrassom intracoronário, a tomografia de coerência óptica auxilia no diagnóstico anatômico diferencial entre lesões coronarianas de apresentação atípica. Neste relato, apresentamos um caso de paciente do sexo feminino com passado de síndrome coronária aguda e, atualmente, com lesão angiográfica complexa, com aspecto de dissecação crônica na artéria descendente anterior. A tomografia de coerência óptica foi o método de imagem intravascular utilizado e a riqueza de detalhes das imagens auxiliou na discussão da etiologia da lesão e de seus diagnósticos diferenciais.

Descritores: Angiografia coronária; Síndrome coronariana aguda; Tomografia de coerência óptica

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INTRODUCTION

Optical coherence tomography (OCT) is an intravascular imaging tool that has been increasingly used in the cardiac catheterization laboratory.¹ Since its spatial resolution is approximately ten-fold greater than intravascular ultrasound (IVUS), OCT helps in the anatomical differential diagnosis of lesions in the coronary arteries with atypical presentation.² The richness of image details produced by this method may, in some cases, be useful to differentiate lesions with ambiguous angiographic aspects, as in the present report, in which it helps differentiating an atherosclerotic plaque with intimal dissection from a recanalized chronic coronary thrombus, based on their morphological aspects.

CASE REPORT

A 64-year-old female patient presented with a history of hypertension, dyslipidemia, diabetes mellitus, obesity, and coronary artery disease. There was a report of previous



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hospitalization 30 years ago (1980s) for acute myocardial infarction, which was medically treated after diagnostic cardiac catheterization. She denied previous percutaneous coronary interventions. Currently, she presented atypical thoracic discomfort for 6 months and underwent a noninvasive evaluation with myocardial scintigraphy, which demonstrated persistent hypoperfusion of the entire anterior wall. Due to the persistence of the symptom, she was electively referred for coronary angiography. The procedure showed a good caliber left main trunk (LMT), with discrete parietal irregularities and no obstructive lesions. The left anterior descending (LAD) artery presented a severe obstructive lesion (80%) in the proximal third, with the angiographic aspect of a plaque with dissection and false lumen (Figure 1). The circumflex (Cx) artery presented discrete parietal irregularities, without obstructive lesions; the dominant right coronary artery (RCA) presented discrete parietal irregularities, without obstructive lesions; the left ventricle (LV) presented moderate anterior hypokinesia.

Due to the presence of a severe obstructive lesion in the coronary territory compatible with the finding of fixed ischemia in scintigraphy, we opted for a cardiac magnetic resonance imaging evaluation, which demonstrated viability in the basal and middle segments of the anterior wall. An intravascular imaging-guided percutaneous coronary intervention was indicated. Since it was an angiographically complex lesion, we opted for an OCT evaluation, instead of using IVUS, due to the higher spatial resolution and, consequently, the greater capacity of OCT to show details of the plaque anatomy.

After catheterizing the left coronary artery and passing a 0.014" Whisper MS (Abbott Vascular, Green Oaks, IL, USA) guidewire, an intracoronary evaluation of the lesion was performed in the proximal third of the LAD, using a Dragonfly™ Duo (St. Jude Medical, Little Canada, MN, USA) OCT catheter,

which demonstrated an extensive atherosclerotic plaque with a false lumen aspect composed of multiple channels, divided by thin-walled septa, with several reentry points into the true lumen, suggesting the anatomical diagnosis of a chronic recanalized thrombus (Figure 2). The following measures were reported: minimum luminal area of 2.1mm²; reference diameters of LAD, distal and proximal to the lesion, of 3.3mm and 3.5mm, respectively; and lesion length of 19.1mm. A pre-dilation with a 3.0x20mm Pantera balloon (Biotronik SE & Co., Berlin, Germany) was performed, followed by a successful implantation of a 3.0x23mm drug-eluting stent Xience Xpedition (Abbott Vascular, Green Oaks, IL, USA), which was post-dilated with a 3.5x12mm Pantera Leo balloon (Biotronik SE & Co., Berlin, Germany). A control angiography demonstrated exclusion of the false lumen (Figure 3), and a control OCT showed edges free of dissection,

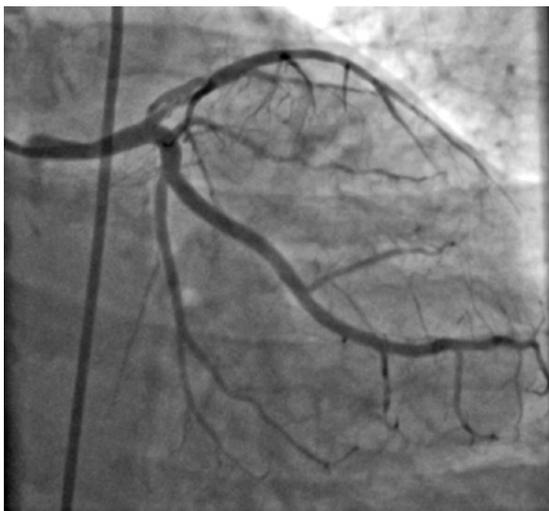


Figure 1. Coronary angiography demonstrating eccentric lesion with the angiographic appearance of false lumen in the proximal third of the anterior descending artery.

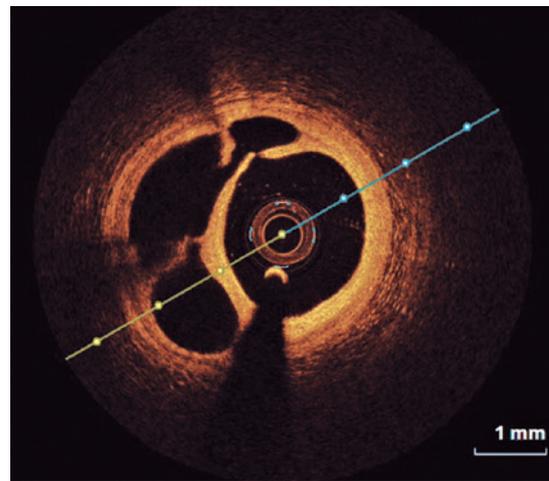


Figure 2. Optical coherence tomography demonstrating eccentric lesion with false lumen and multiple microchannels, suggestive of chronic recanalized thrombus.

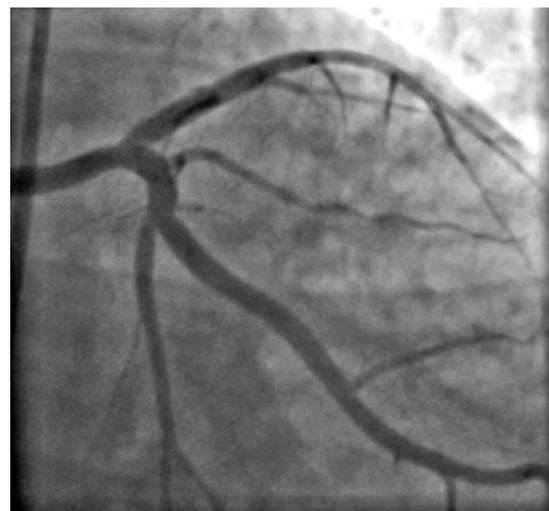


Figure 3. Control angiography after stent implantation with exclusion of the false lumen.

well expanded struts with good apposition, and a significant increase in the vessel lumen, obliteration of the false lumen and focal prolapses of debris into the stent (Figure 4).

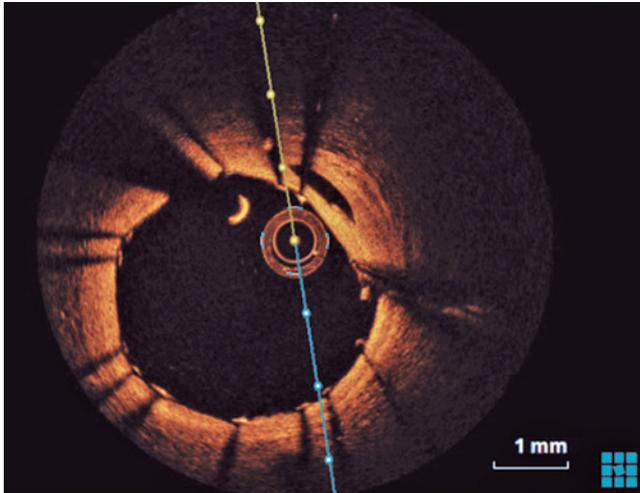


Figure 4. Control optical coherence tomography after stent implantation demonstrating adequate apposition of the struts and retraction of the false lumen.

DISCUSSION

The reported case illustrates an example of a lesion that is difficult to differentiate using only coronary angiography. Contrast attenuation and filling defects are common angiographic findings, but they are not specific for the diagnosis of a recanalized thrombus and can be found in other situations, such as in plaque erosion, spontaneous coronary dissection, or severe calcification.³ The association of an intravascular imaging method allows better anatomical evaluation of the vessel, providing details of the plaque (false lumen, microchannels, and their relation to the true lumen).⁴ Even with the use of OCT, the differential diagnosis between thrombus and dissection may be difficult and controversial.⁵ Unspecific aspects of the lesion can be found in both scenarios, such as the existence of underlying fibro-lipid atherosclerotic plaques, with thin cap in some segments, the presence of fibrin strands, absence of acute thrombus (white and/or red), and several tears on the inner layer of the vessel. In our case report, the chaotic aspect of the multiple microchannels (“Swiss cheese”), with thin septa and different reentry points into the true lumen, as well as a past history of non-reperused acute myocardial

infarction, suggests that the most likely etiology is a thrombus that spontaneously recanalized.

The findings presented in this case are very similar to those described in a series published by Kang et al., in which six patients with a diagnosis of recanalized thrombus were evaluated with OCT, IVUS, and coronary angiography.⁶ The authors concluded that the angiographic findings, such as multiple irregular filling defects and intraluminal contrast attenuation, were not specific for recanalized thrombus. On the other hand, the OCT showed multiple small channels divided by fine septa, which communicated with one another. Despite the neovascularization process, most of these lesions were functionally significant.

Thus, we report a situation in which the diagnosis is challenging when using only angiography, and where the OCT adds important elements and richness of details, thus aiding in the etiological elucidation of the lesion and its differential diagnoses.

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None.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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