

Optical Coherence Tomography in the Management of Intermediate Lesion in a Patient with Acute Coronary Syndrome

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ABSTRACT

Optical coherence tomography provides high-resolution tomography imaging of the coronary microstructure, allowing for detailed characterization of atherosclerotic plaque components and morphology, in addition to an accurate determination of vascular dimensions. We report the case of a patient with an intermediate coronary lesion, presenting in the subacute phase of a myocardial infarction, in whom optical coherence tomography was used as an adjunctive diagnostic method to aid in the decision-making process and to guide the interventional procedure.

DESCRIPTORS: Arteriosclerosis. Myocardial infarction. Coronary stenosis. Tomography, optical coherence. Percutaneous coronary intervention. Stents.

The finding of intermediate stenosis on coronary angiography in patients with ST-segment elevation acute myocardial infarction (STEMI) who underwent thrombolytic therapy is not a rare event. In this situation, the decision about the need for coronary artery bypass graft (CABG) may pose a challenge. Studies of angiography, by being lumino grams, do not allow for the assessment of the components and of the morphology of the underlying plate. Furthermore, the invasive physiological assessment has limited role in the first day's post-infarct, not allowing for an accurate determination of the functional significance of the stenosis.

The present article reports a case where optical coherence tomography (OCT) was used to aid in the

RESUMO

Utilização da Tomografia de Coerência Ótica na Abordagem de Lesão Intermediária em Paciente com Síndrome Coronariana Aguda

A tomografia de coerência ótica fornece imagens tomográficas da microestrutura coronária em alta resolução, possibilitando detalhada caracterização dos componentes e da morfologia da placa aterosclerótica, além de acurada determinação das dimensões vasculares. Relatamos aqui o caso de um paciente com lesão intermediária, na fase subaguda de um infarto do miocárdio, no qual a tomografia de coerência ótica foi utilizada como método diagnóstico complementar para a tomada de decisão e para guiar o procedimento.

DESCRITORES: Arteriosclerose. Infarto do miocárdio. Estenose coronária. Tomografia de coerência ótica. Intervenção coronária percutânea. Stents.

diagnostic workup of a patient with moderate stenosis, identified on the third day of his post-infarction evolution, and submitted to thrombolytic therapy with reperfusion criteria. This method allowed for the identification of the components and morphology of the atherosclerotic plaque, as well as offered an accurate determination of stenosis severity, aiding in our decision-making process. In addition, OCT was used to guide and optimize a percutaneous coronary intervention.

CASE REPORT

Male patient, 65 years old, was admitted to the emergency service of a general hospital three hours after onset of high intensity, oppressive retrosternal pain,

started at rest. The initial electrocardiogram showed an ST-segment elevation of 3 mm in the leads applied on the inferior wall. A pharmacological reperfusion strategy by intravenous administration of streptokinase (1,500,000 IU) was adopted, with a door-to-needle time of 20 minutes. The patient experienced improvement of symptoms and complete resolution of ST-segment elevation. Then, the patient was referred to our institution to this institution for invasive stratification on the third day post-infarction. The patient was asymptomatic since the administration of the thrombolytic agent.

A coronary angiography was performed by the right radial route, with a6F arterial sheath. The left coronary showed slight parietal irregularities, without significant obstruction. The right coronary artery was dominant and showed moderate (50%) and segmental stenosis in its middle third, with preserved distal flow (Thrombolysis in Myocardial Infarction [TIMI] 3). The contractile function of the left ventricle was preserved (Figure 1). When an intermediate lesion in the culprit vessel, shown in two projections (Figure 2), was observed, the authors chose to perform an OCT to complement the diagnosis.

The OCT images were acquired with the commercially available Frequency Domain system (C7XR®;

St. Jude Medical, St. Paul, United States). After administration of intracoronary nitroglycerin (200 mg), a guide wire with 0.014" diameter was advanced, crossing the stenosis and positioned in the distal bed of the right coronary artery. Then, the imaging catheter DragonFly® (St. Jude Medical, St. Paul, USA), duly calibrated with adjustment of Z-offset parameters, was positioned distal to the stenosis. An intracoronary injection of ioxaglate (Hexabrix®; Guerbet, Gorinchem, The Netherlands), using an infusion pump programmed to inject 3 mL/s for 3 seconds, was performed through the guide catheter, temporarily removing the intracoronary blood to acquire the images with automatic traction of the imaging catheter at a speed of 20 mm/s.

The OCT imaging evaluation revealed an extensive lesion (28.4 mm), with minimal luminal area of 1.83 mm², generating a stenosis area rate of 76%, compared to the average of luminal areas from normal, distal, and proximal references to the stenosis (Figure 3). From a qualitative point of view, OCT revealed a lipid-rich plaque, with findings compatible with intense macrophage infiltration, fibrous cap rupture, and presence of a predominantly intraluminal red thrombus. At the site of rupture, the fibrous cap measured 60 µm. The

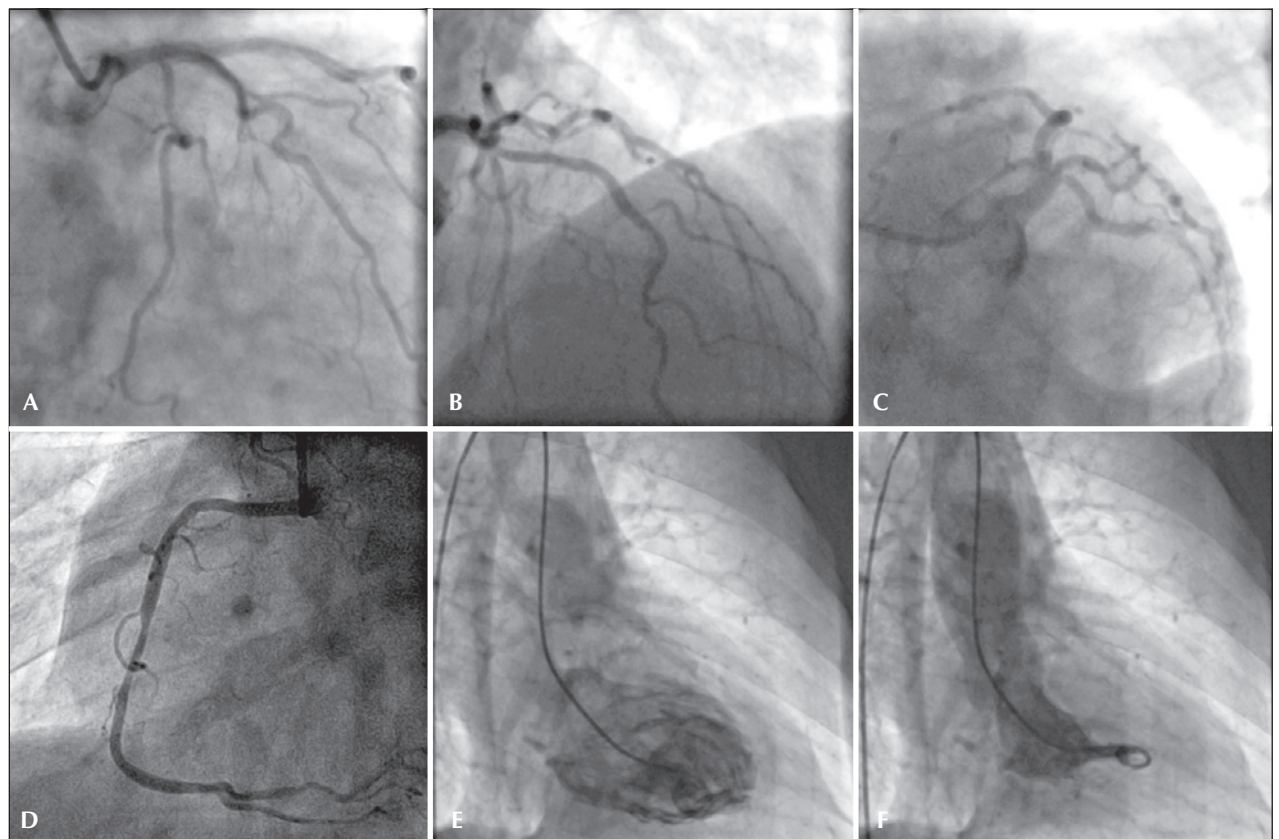


Figure 1 – Coronary angiography. The left coronary artery showed slight parietal irregularities without significant obstruction (A, B, and C). The right coronary artery showed moderate segmental injury in its middle third, with preservation of distal flow (D). The contractile function of the left ventricle was preserved. Left ventriculography in diastole (E); left ventriculography in systole (F).

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