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EDITORIAL COMMENT

Revascularization of chronic total occlusion – Does the side matter?

Revascularização de CTO – o lado importa?

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Chronic total occlusions (CTOs) can be found in 15–20% of patients with coronary artery disease undergoing coronary angiography and 50–70% of patients who have undergone coronary artery bypass grafting. A CTO can be the consequence of an unnoticed and untreated acute event or, more often, of a slowly progressing process of luminal narrowing, in which case the function of the affected myocardial region can be relatively preserved by the recruitment of collateral circulation. Nonetheless, in the majority of patients, the presence of a CTO leads to a reduced blood supply and is therefore associated with an increased risk of mortality, arrhythmias and a variety of symptoms.[1–3]

CTO lesions can cause symptoms that are different from the classic symptoms of coronary artery disease, with less frequent typical angina and a greater prevalence of other forms of chest discomfort, dyspnea, asthenia, fatigue and depression. The slow progression of the obstruction can result in patients adapting, making it difficult to recognize symptoms and hence the existence of the disease.[1]

These patients are usually older and have more comorbidities than those with coronary artery disease other than CTOs, and as a consequence generally have a worse prognosis.[1]

CTO recanalization is one of the most complex revascularization procedures and, despite the high prevalence of CTO lesions, accounts for only a small proportion of total percutaneous coronary intervention (PCI) volume, mainly due to historical low success rates, higher incidence of complications, longer procedure duration, high costs and perceived lack of clinical benefit. However, in recent years, there has been increased interest in CTO PCI, along with higher success rates and a lower incidence of complications, due to increased operator experience, development of a systematic approach enabling standardization of these procedures with more predictable results, refinements of the technique and dedicated high-performance devices.[2,3]

The main indication for CTO PCI is symptom relief; potential benefits include angina relief, improvements in quality of life and exercise capacity, decrease in ischemic burden, improvement in left ventricular function and even increased survival, although randomized controlled trials have failed to demonstrate reduced mortality.[1,2,4,5]

CTOs are most frequently seen in the right coronary artery (RCA), followed by the left anterior descending artery (LAD) and left circumflex (LCx).[1,5] The only territory that potentially has an ischemic burden >10%, the commonly used threshold for intervention, is that of the LAD. In one study the median ischemic burden of proximal LAD CTOs was 14.7%, while for both the LCx and the RCA it was 5.9%, meaning that RCA and LCx CTO PCI potentially have less impact on prognosis.[6]

In this issue of the *Journal*, Costa et al.[7] analyze the outcomes of RCA-CTO PCI in comparison with left coronary artery (LCA) CTO PCI, finding no difference in myocardial infarction or all-cause mortality rates. The primary outcome of recurrence of angina and/or heart failure (HF) symptoms

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was significantly more frequent in RCA-CTO, mainly driven by recurrence of HF symptoms. RCA-CTO PCI was an independent predictor of the primary outcome, making it potentially less beneficial for patients. The only predictor of mortality was found to be left ventricular ejection fraction.

There is little information on the impact of RCA-CTO PCI in the literature. In the IMPACTOR trial, 94 symptomatic patients with dominant RCA-CTO were randomized to optimal medical therapy (OMT) versus OMT plus PCI. At 12 months, the PCI group showed significantly lower myocardial ischemic burden, improved functional status and improved quality of life.[8]

In a single-center retrospective analysis of OMT versus CTO PCI in 731 patients with single coronary lesions, the five-year cumulative incidence of the composite of total death or myocardial infarction was significantly lower after PCI than after OMT or failed PCI in the RCA and LCx groups, but not in the LAD group.[9]

A recently presented analysis of the PROGRESS-CTO registry including 11 560 CTO PCIs (54.1% of which were RCA-CTO PCIs) performed at 44 centers between 2012 and 2022 demonstrated procedural success rates between 83.1% and 86% in the RCA-CTO PCI group, with major adverse cardiovascular event rates of 1.7–2.4%, depending on the RCA segment in which the CTO was located.[10]

In conclusion, contemporary CTO PCI has high success and low complication rates when performed by experienced operators, but there are conflicting data regarding the outcomes of RCA-CTO PCI compared to LCA-CTO PCI.

The study by Costa et al.[7] adds relevant information, but further studies are necessary to better understand this issue.

New techniques and new devices may lead to improved success rates and even better outcomes.

Conflicts of interest

The author has no conflicts of interest to declare.

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