

How multislice computed tomography of the coronary arteries can change the chronic total occlusion recanalization procedure

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The Euro CTO Club guidelines advise against performing ad hoc coronary intervention (PCI) of chronic total occlusion (CTO) — it should be done after a careful analysis of coronary angiography [1]. However, performing multislice computed tomography (MSCT) of the coronary arteries before coronary angiography may change this strategy.

MSCT of the coronary arteries was performed in a 58-year-old man with arterial hypertension, hypercholesterolemia, type 2 diabetes mellitus, and Canadian Cardiovascular Society (CCS) class II angina over a period of 12 months. MSCT showed a 10 mm occlusion (Figure 1A, 1C) in the proximal segment of the dominant right coronary artery (RCA). In addition, there was critical stenosis distal to the occlusion.

Angiography (Figure 1B, 1D), in contrast to the MSCT results, revealed a 40 mm long RCA CTO with bifurcation at the distal cap. The CTO had an ambiguous proximal cap, and the distal part of the vessel could be visualized with ipsilateral and contralateral collaterals (J-CTO score 2 — intermediate category of difficulty).

Based on the information from MSCT (visible entry and length — CT-RECTOR score — 0 — easy difficulty category), in contrast to the angiography result, the dedicated CTO operator decided to perform ad hoc PCI CTO from right femoral arterial access.

Using Gaia Second and Confianza wires and a microcatheter, the lesion was crossed in 25 seconds. After pre-dilation, a Xience Pro drug-eluting stent (3.5 × 48 mm) was implanted, followed post-dilation by an NC balloon inflated to 18 atmospheres (Figure 1E). The

CTO procedure lasted 20 minutes (45 minutes with angiography), with a radiation dose of 0.229 Gy, fluoroscopy time — 16.1 minutes, and contrast — 200 ml. The periprocedural period was uncomplicated.

In conclusion, distal RCA stenosis blocked the retrograde flow of contrast, mimicking a much longer CTO lesion in angiography. Based on the MSCT reconstruction, *ad hoc* PCI CTO could be performed.

Coronary CT angiography has become a significant step forward in evaluating the benefit-risk balance of the CTO PCI procedure [2]. The main purpose of using MSCT before CTO PCI is to quantify the structure of atherosclerotic plaque and to provide detailed anatomical information about coronary vascularity [2].

According to the literature, pre-procedural coronary CT guidance for CTO was associated with fewer direct periprocedural complications, including periprocedural myocardial infarction and coronary perforation [3]. The intra-procedural use of CT may be limited by the need for additional doses of radiation and contrast in patients undergoing PCI [4]. However, CT-guided CTO procedures have been found to have significantly higher success rates than procedures performed without CT [4, 5]. What is more, CT-guided PCI is associated with a shorter procedure duration, so it can be hypothesized that the dose of radiation and contrast during these procedures may be lower than in patients not undergoing CT scans [4].

Coronary CT angiography is becoming the basic tool in the treatment of CTO from

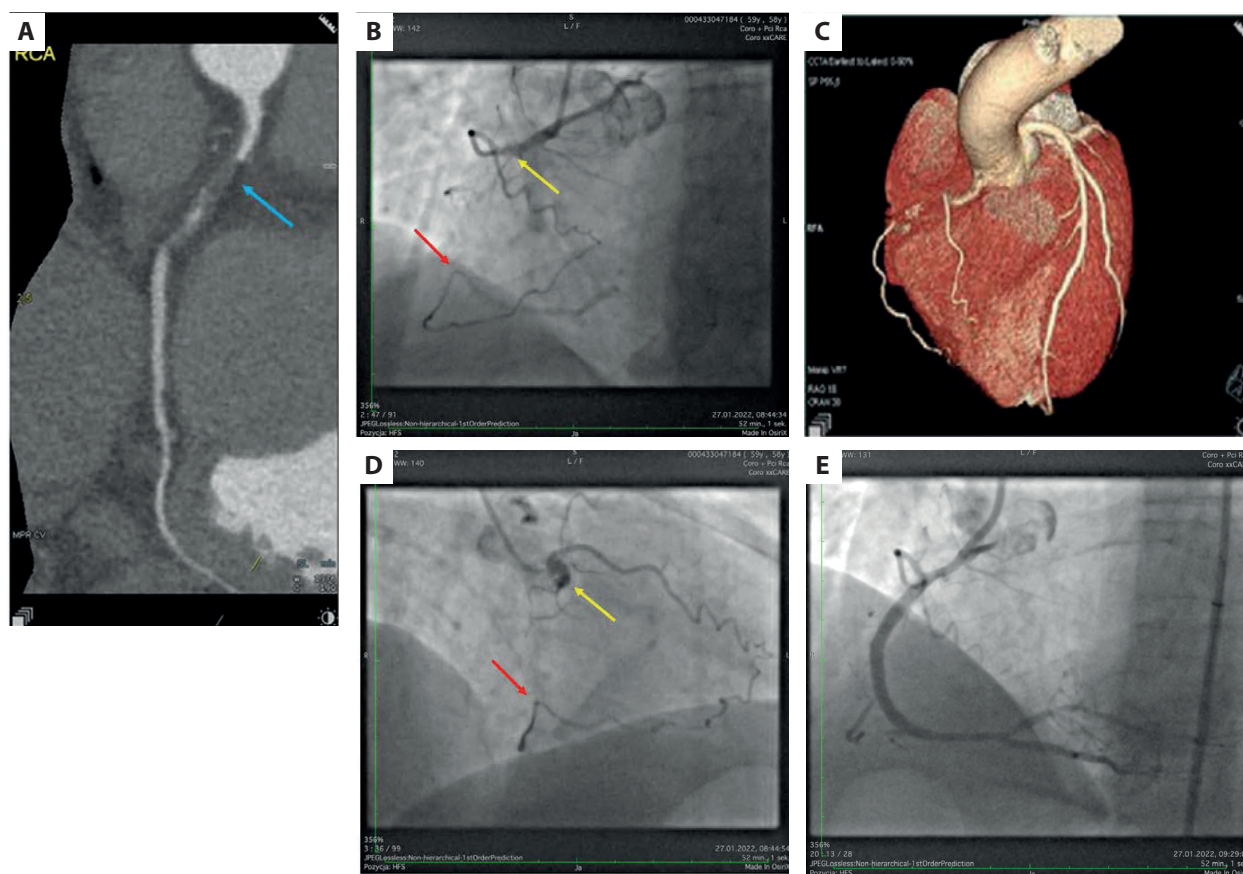


Figure 1. **A.** Multislice computed tomography (MSCT) — a 10 mm occlusion (blue arrow) in the proximal segment of the dominant right coronary artery (RCA). **B.** Right coronary artery (RAO 30° projection) — proximal occlusion (yellow arrow), blunt stump visible. From the ipsilateral collateral circulation, the middle and distal sections fill. End of occlusion (red arrow). The length of the occlusion assessed angiographically — approx. 40–45 mm. **C.** MSCT (RAO 18) — a 10 mm occlusion in the proximal segment of the dominant right coronary artery (RCA). **D.** Right coronary artery (LAO 30° projection) — proximal occlusion (yellow arrow), blunt stump visible. From the ipsilateral collateral circulation, the middle and distal sections fill. End of occlusion (red arrow). Angiographically assessed occlusion length — approx. 40–45 mm. **E.** Right coronary artery (RAO 30° projection), image after stent implantation

pre-procedural evaluation and intra-procedural control to follow-up [4]. A new horizon in interventional cardiology could be the use of CT scans directly in the catheterization lab for real-time PCI [4].

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