

# Multislice computed tomography coronary angiography before percutaneous recanalization of chronic total occlusions

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## Abstract

Chronic totally occluded coronary arteries are frequently found in symptomatic patients undergoing diagnostic coronary angiography. However, the presence of such an artery has a significant impact on choice of revascularization treatment. This case report shows the potential of preprocedural multislice computed tomography coronary angiography in guiding percutaneous revascularization of chronic totally occluded coronary arteries.

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**Keywords:** Chronic total occlusion, coronary artery, multislice computed tomography, percutaneous revascularization

## Case report

A 64-year-old man with persistent symptoms of typical angina pectoris and a positive exercise test underwent diagnostic conventional coronary angiography to evaluate the presence and extent of coronary artery disease. Selective catheterization of the left coronary artery showed retrograde filling of the right coronary artery (RCA) supplied by a large collateral originating from the distal left anterior descending coronary artery (LAD). The operator was not able to catheterize the RCA, which suggested an ostial occlusion (*Figure 1*). Multislice computed tomography (MSCT) coronary angiography was performed using a 64-slice computed tomography (CT) scanner (Sensation 64, Siemens Medical Solutions, Forchheim, Germany). The CT scan showed a large calcified plaque at the ostium of the RCA and confirmed the

presence of a totally occluded RCA with good collateral filling (*Figure 2a*). In addition, the collateral originating from the distal LAD was well visualized throughout its course to the mid part of the RCA (*Figure 3a*). The patient was scheduled to undergo percutaneous recanalization of the RCA on the basis of the conventional and CT coronary angiography findings. During this procedure, the location of the large calcified plaque in the ostium of the RCA, as seen on cardiac CT, was used to guide cannulation of the RCA. The proximal RCA lesion was then successfully crossed and treated with a short drug-eluting stent (*Figure 2b*). No procedure-related complications occurred.

The patient underwent a second MSCT coronary angiography scan 4 months after the successful recanalization, to evaluate the patency of the stent. The CT scan not only showed a patent stent without in-stent

## Case report

### MSCT to guide percutaneous revascularization

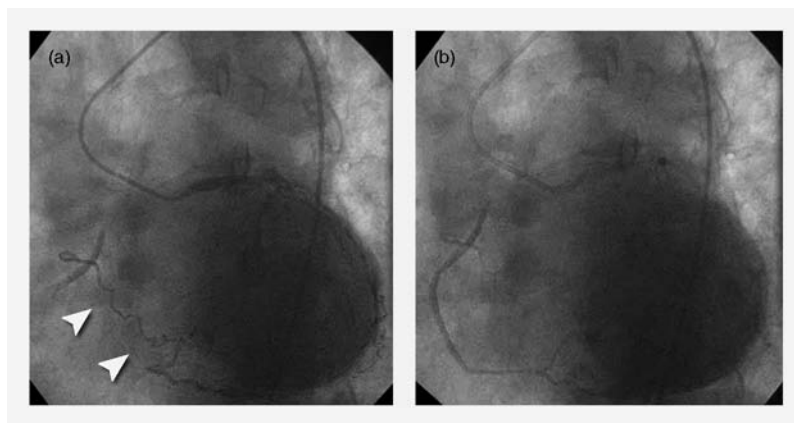


Figure 1. (a) Selective catheterization of the left coronary artery, showing retrograde filling of the right coronary artery (RCA) by a large collateral (arrowheads) originating from the distal left anterior descending coronary artery. (b) Almost the entire RCA is visualized after prolonged injection of contrast material.

restenosis, but also demonstrated a significant increase in lumen diameter after recanalization of the RCA when compared with the preprocedural CT scan (Figure 2b). In addition, the collateral vessel originating from the LAD could not be visualized with the second scan, as a result of restoration of antero-grade flow in the RCA (Figure 3b).

### Discussion

Chronic total occlusions are found in approximately 50% of patients with significant coronary artery disease. The majority of patients with such occlusions are

either treated medically or referred directly for coronary bypass surgery. An attempt at percutaneous recanalization is usually performed in the absence of characteristics of chronic total occlusion that are known to be adverse predictors of a successful outcome, such as an occlusion length greater than 15 mm and the presence of calcifications in the occluded vessel [1,2]. MSCT coronary angiography allows reliable evaluation of coronary plaque morphology [3–6]. MSCT has several advantages in the assessment of chronic total occlusions, when compared with conventional angiography: it does not require selective catheterization to enhance the coronary lumen, coronary calcifications are easily detected, and its 3-dimensional nature allows accurate measurements of length that do not suffer from calibration limitations, foreshortening, or absence of collateral filling as occurs with conventional angiography [7].

Performance of MSCT coronary angiography may optimize the selection of patients for attempted percutaneous recanalization of chronic total occlusions. Moreover, as this case report illustrates, additional information such as anatomical landmarks may be helpful in the treatment of chronic total occlusions.

### Summary

Multislice computed tomography coronary angiography provides important additional morphologic characteristics of chronic total occlusions when compared with conventional diagnostic coronary angiography. This may lead to optimized selection of patients referred to undergo percutaneous recanalization, or to refinement of the optimal percutaneous intervention strategy. ■

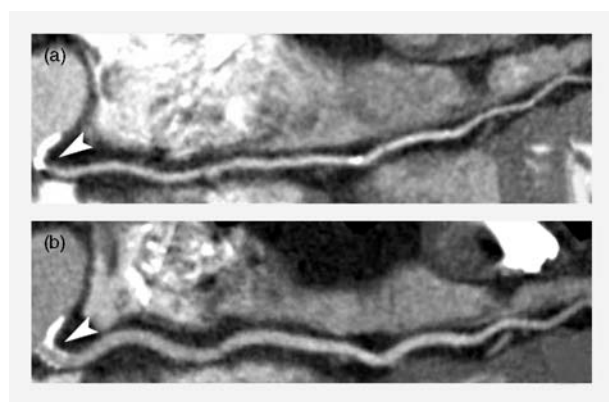


Figure 2. Curved multiplanar reconstructed computed tomography images of the right coronary artery (RCA) before (a) and after (b) successful recanalization. (a) A large calcified aortic plaque and an ostial total occlusion of the RCA are clearly seen (arrowhead). (b) After the recanalization, a patent stent at the proximal part of the RCA and a significant increase in lumen diameter are evident (arrowhead), compared with the preprocedural computed tomography scan.

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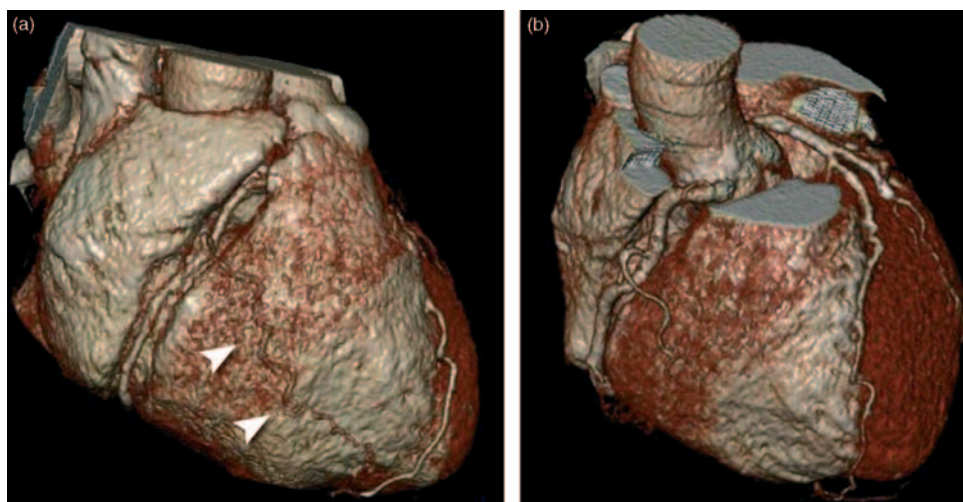


Figure 3. (a) Volume-rendered computed tomography images of the heart, demonstrating the presence of a large collateral originating from the distal left anterior descending coronary artery towards the mid part of the occluded right coronary artery (arrowheads). (b) After the successful percutaneous recanalization, the collateral could no longer be visualized because of restoration of anterograde flow.

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