

Triple-vessel coronary disease with multiple stents

Afonso Akio Shiozaki, MD, PhD¹; Igor Soffa, MD¹; Vinícius Eiji Kameoka, MD¹; Marcos Franchetti, MD¹; Julio de Paiva Maia, MD¹; Pâmela Bertolazzi, BS²

¹ Paraná Hospital Diagnostic Center (Centro Diagnóstico Hospital Paraná), Maringá-Pr, Brazil

² Siemens Healthineers, LAM

History

A 63-year-old male patient, complaining of dyspnea during exertion, came to the hospital for a check-up. The patient had undergone percutaneous coronary revascularization (PCR) and stenting 7 years ago. He had a history of arterial hypertension and a family history of coronary artery disease (CAD). A coronary CT angiography (cCTA) was requested to assess the stent patency and to rule out coronary stenosis.

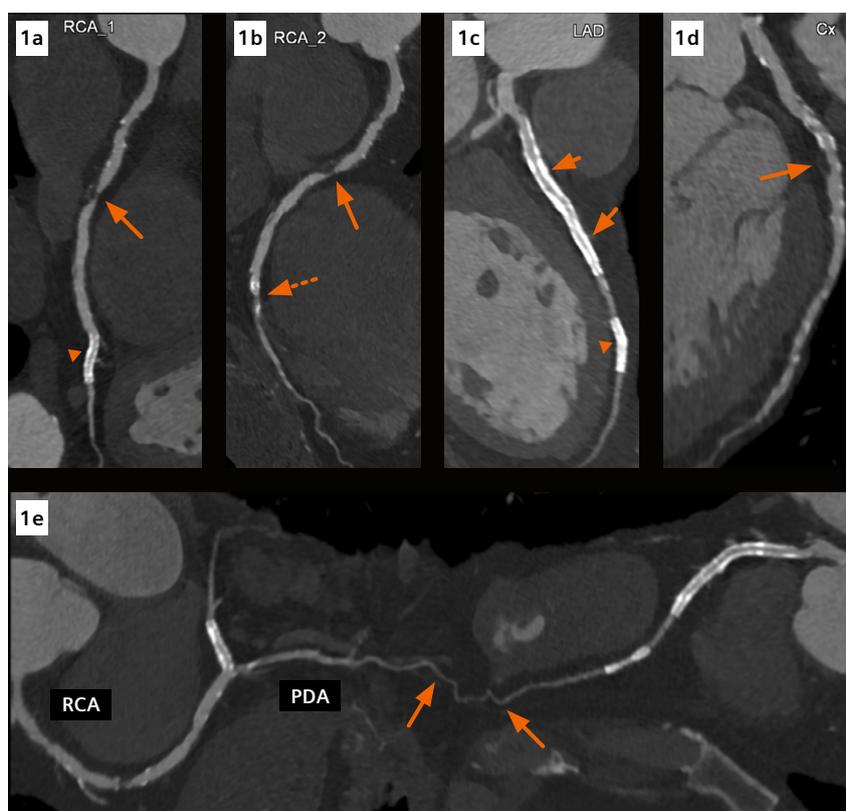
Diagnosis

cCTA images showed a right coronary artery (RCA) dominant system. Severe stenoses in the mid-RCA and in the proximal posterior descending artery (PDA) were seen, caused by mixed plaques. Two long, partially overlapping stents in the proximal and middle third of the left anterior descending artery (LAD) and another two short stents in the distal LAD and proximal posterior ventricular artery (PVA) were visualized. The courses of the coronary arteries distal to the stents were well-enhanced with contrast agent, suggesting stent patency. There were no signs of an incongruent course of the stents, which would indicate a stent fracture. The PDA and the LAD were distally connected. A moderate stenosis in the mid-circumflex artery (Cx), caused by a non-calcified plaque, was present. The patient subsequently underwent PCR and stenting in the RCA and PDA and recovered uneventfully.

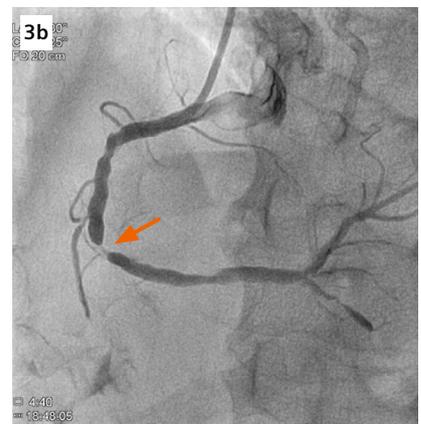
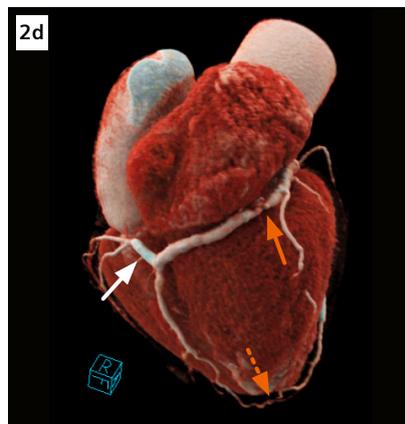
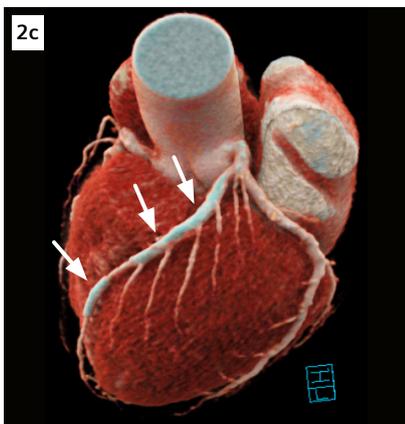
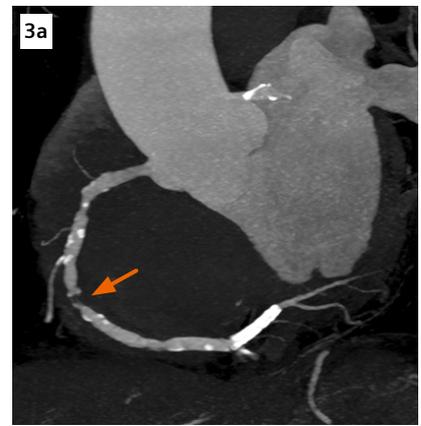
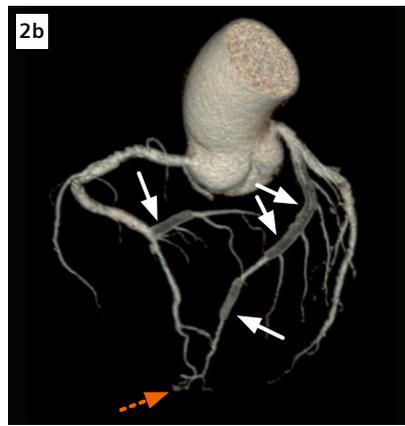
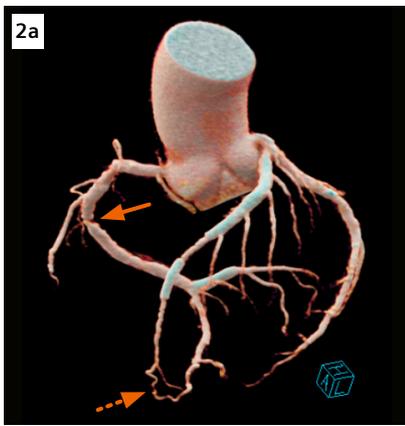
Comments

Triple-vessel coronary disease is an extreme form of CAD, affecting all three major coronary arteries. It may have an adverse outcome if it is not promptly diagnosed and treated. cCTA is a non-invasive imaging method available for an initial diag-

nosis of CAD and follow-up assessment. In this case, coronary stenosis, caused by calcified and non-calcified plaques, are clearly seen. Although a direct visualization of the in-stent restenosis is somewhat limited due to the blooming effect caused by



1 cMRA images show severe stenoses in the mid-RCA (Figs. 1a & 1b, arrows) and proximal PDA (Fig. 2b, dotted arrow) caused by mixed plaques. Two long, partially overlapping stents in the proximal and middle third of the LAD (Fig. 1c, short arrows) and another two short stents in the distal LAD (Fig. 1c, arrowhead) and proximal PVA (Fig. 1a, arrowhead) are patent. A moderate stenosis in the mid-Cx, caused by a non-calcified plaque (Fig. 1d, arrow), is present. The PDA and the LAD are distally connected (Fig. 1e, arrows).



metal struts and the smaller size of the stents, the patency of the stents is assessable. Owing to the optimal image quality, a small distal connection of the PDA and the LAD is clearly visible.

Advanced techniques, such as curved multiplanar reconstruction (cMPR) and cinematic volume rendering technique (cVRT), facilitate image demonstration of the anatomic details in all three dimensions. ●

2 cVRT images show the 4 patent stents (white arrows), severe stenosis in the mid RCA (orange arrows) and the distal connection between the PDA and the LAD (dotted arrows).

3 A CT MIP image (Fig. 3a) shows a severe stenosis in the mid RCA (arrow), which is consistent with angiogram (Fig. 3b).

Examination Protocol

Scanner	SOMATOM go.Top
Scan area	Heart
Scan mode	Retrospective ECG gated spiral scan
Scan length	131 mm
Scan direction	Cranio-caudal
Scan time	4 s
Tube voltage	100 kV
Effective mAs	46 mAs
Dose modulation	CARE Dose4D
CTDI _{vol}	14.4 mGy

DLP	216 mGy*cm
Rotation time	0.33 s
Pitch	0.27
Slice collimation	128 x 0.6 mm
Slice width	0.6 mm
Reconstruction increment	0.3 mm
Reconstruction kernel	Bv36, SAFIRE 3
Heart rate	58–62 bpm

Contrast	350 mg/mL
Volume	60 mL + 20 mL
Flow rate	5 mL/s
Start delay	Bolus tracking with 100 HU in the ascending aorta +7 s

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customer's unique setting. Because there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT and/or automation adoption) there can be no guarantee that other customers will achieve the same results.