

Cardiac Imaging

Imaging the Periphery of an Occluded Left Anterior Descending Coronary Artery: Need for Selective Conus Artery Catheterisation

ELEFThERIOS TSIAMIS, GEORGE LAZAROS, ATHANASSIOS PATIALIAKAS,
DIMITRIOS MARAGIANNIS, CHRISTODOULOS STEFANADIS

1st Cardiology Department, School of Medicine, University of Athens, Hippokration Hospital, Athens, Greece

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A 56-year-old man, a current smoker with a history of arterial hypertension and dyslipidaemia, was admitted to our department for a scheduled coronary angiography. Ten days earlier, the patient had been admitted to another hospital for an anterior myocardial infarction, treated with intravenous thrombolysis. The patient's in-hospital course was reported to have been complicated by an episode of postinfarction angina on the 4th hospital day and coronary angiography was consequently recommended.

On his present admission the physical examination was unremarkable. An electrocardiogram showed loss of the R waves along with repolarisation abnormalities in leads V₁ to V₄. Echocardiographic examination revealed hypokinesis of the mid and apical interventricular septum, anterior wall and apex. The left ventricular contractility was moderately impaired (ejection fraction 40%). Finally, coronary angiography revealed total occlusion of the left anterior descending coronary artery (LAD) in its proximal part, a subtotal obstruction of the first diagonal branch and total occlusion of the right coronary artery (RCA) in its mid portion (Figures 1, 2). Distal LAD opacification was not detected even after prolonged intracoronary injection of contrast in the left coronary system, whereas at the same time late visualisation was ob-

tained of the posterior descending coronary artery (PDA) via collaterals (Figure 3). Similarly, prolonged injection of contrast in the RCA did not reveal any LAD filling (Figure 4). Selective catheterisation of an independently arising conus artery clearly visualised the distal LAD through multiple collaterals (Figure 5). The patient was subsequently referred for cardiac surgical evaluation.

The conus coronary artery has been reported to arise independently of the right coronary artery from a separate orifice in the right sinus of Valsalva (just above the right coronary ostium) in 45-50% of hearts.¹ It passes towards the LAD, anteriorly and superiorly to the right outflow tract, to supply the infundibulum of the right ventricle. In patients with occlusion of the LAD or RCA, the conus artery often serves as a principal source of collateral circulation.² The collateral channels for reconstitution of an occluded proximal LAD constitute the circle of Vieussens (or 'Vieussens ring'). In a relevant study of 150 patients with an occluded LAD, the conus artery was identified as the source of collaterals to the LAD in 30 cases.³ Moreover, in 9 patients the conus artery was the exclusive collateral pathway to the LAD.

In the case presented here, while catheterisation of both left and right coronary systems failed to detect the LAD periph-

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Address:

George Lazaros

31 Achilleos St.

17562 P. Faliro

Athens, Greece

e-mail:

glaz35@hotmail.com

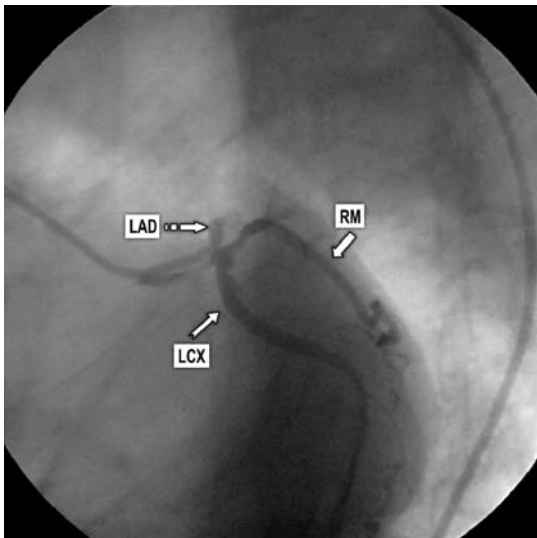


Figure 1. Left anterior oblique projection of the left coronary artery with caudal angulation ('spider' view) revealing total LAD occlusion in its proximal part. LAD – left anterior descending coronary artery; LCX – left circumflex coronary artery; RM – ramus medianus.

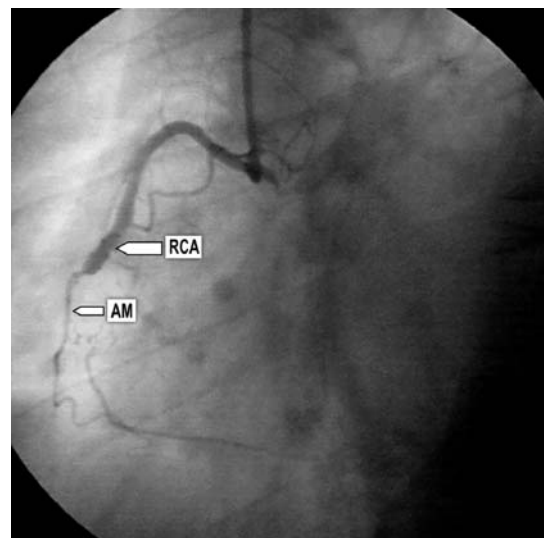


Figure 2. Left anterior oblique projection disclosing total occlusion of the RCA in its mid portion. RCA – right coronary artery; AM – acute marginal.

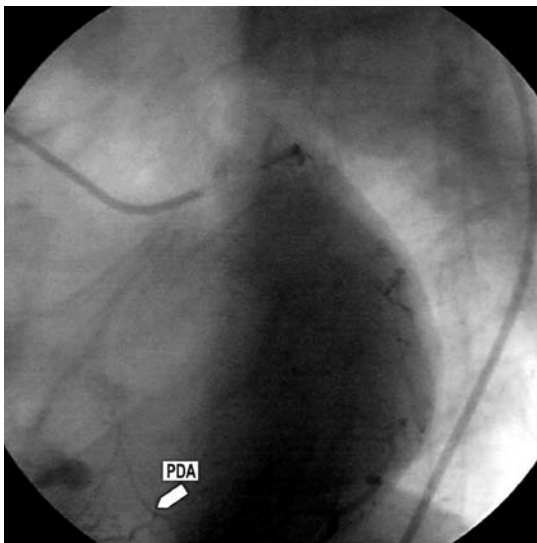


Figure 3. "Spider" view of the left coronary artery. Late frame obtained after prolonged intracoronary injection of contrast revealing no filling of the distal LAD. However, late visualisation of the PDA via collaterals is shown. LAD – left anterior descending coronary artery; PDA – posterior descending coronary artery.

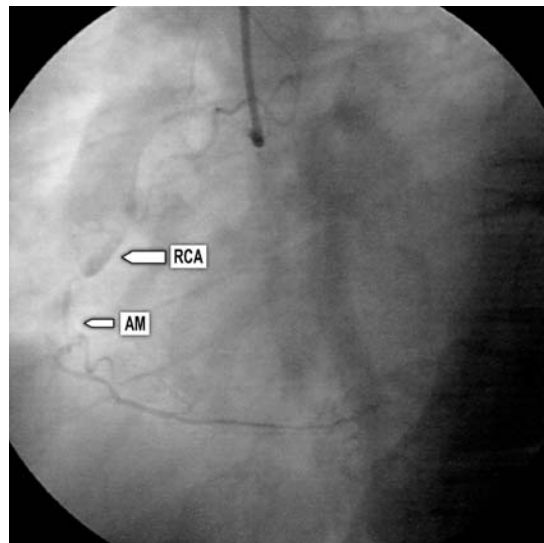


Figure 4. Left anterior oblique view of the RCA. Late frame obtained after prolonged intracoronary injection of contrast revealing no LAD opacification. LAD – left anterior descending coronary artery; RCA – right coronary artery; AM – acute marginal.

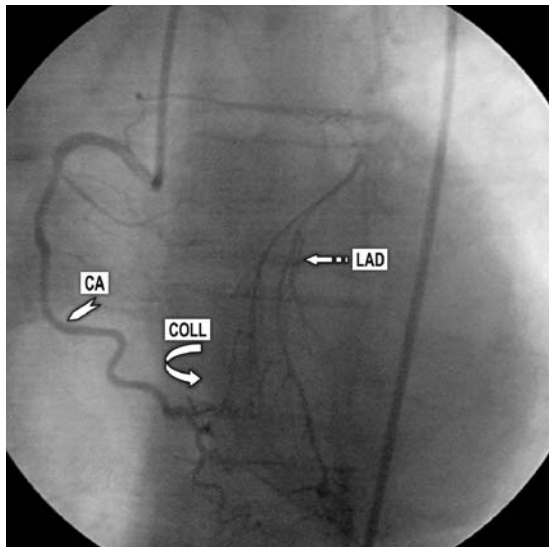


Figure 5. Anteroposterior view. Selective catheterisation of an independently arising conus artery with distal filling of the LAD via collateral circulation. CA – conus artery; LAD – left anterior descending coronary artery; COLL – collaterals.

ery, selective conus artery cannulation clearly visualised its distal part through collaterals. Indeed, during coronary arteriography in cases with an independent conus artery origin, eventual conus-LAD collaterals might go undetected. Because the degree of distal LAD filling (via collateral circulation) potentially affects medical and surgical decisions, it is important to attempt to visualise the conus artery adequately whenever there is obstruction of the LAD and/or RCA.^{4,5} In this case, distal

LAD detection provided an even stronger indication for surgical treatment, and allowed thorough surgical planning. Finally, when conus artery catheterisation is not performed (either for technical reasons or for the fear of inducing malignant arrhythmias and pressure dumping) multi-slice computed tomography has recently been proposed as an alternative approach.⁶

We conclude that selective conus artery cannulation is mandatory in cases of LAD occlusion when conventional left and right angiography do not demonstrate collateral channels to the LAD.

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