

Infarct or pericarditis?

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Case report

A 56-year-old man was referred at 5 a.m. with severe central chest pain radiating into the left arm, which had awoken him from sleep one hour previously. He was a smoker, and had untreated hypertension and dyslipidaemia. On admission the patient had ongoing severe chest pain (visual analogue scale: 10/10) alt-

hough the ambulance team had already administered 12 mg of morphine. The ECG on admission is shown in figure 1.

Questions

Is this an acute myocardial infarction or pericarditis? If it is an infarct, which coronary artery is occluded?

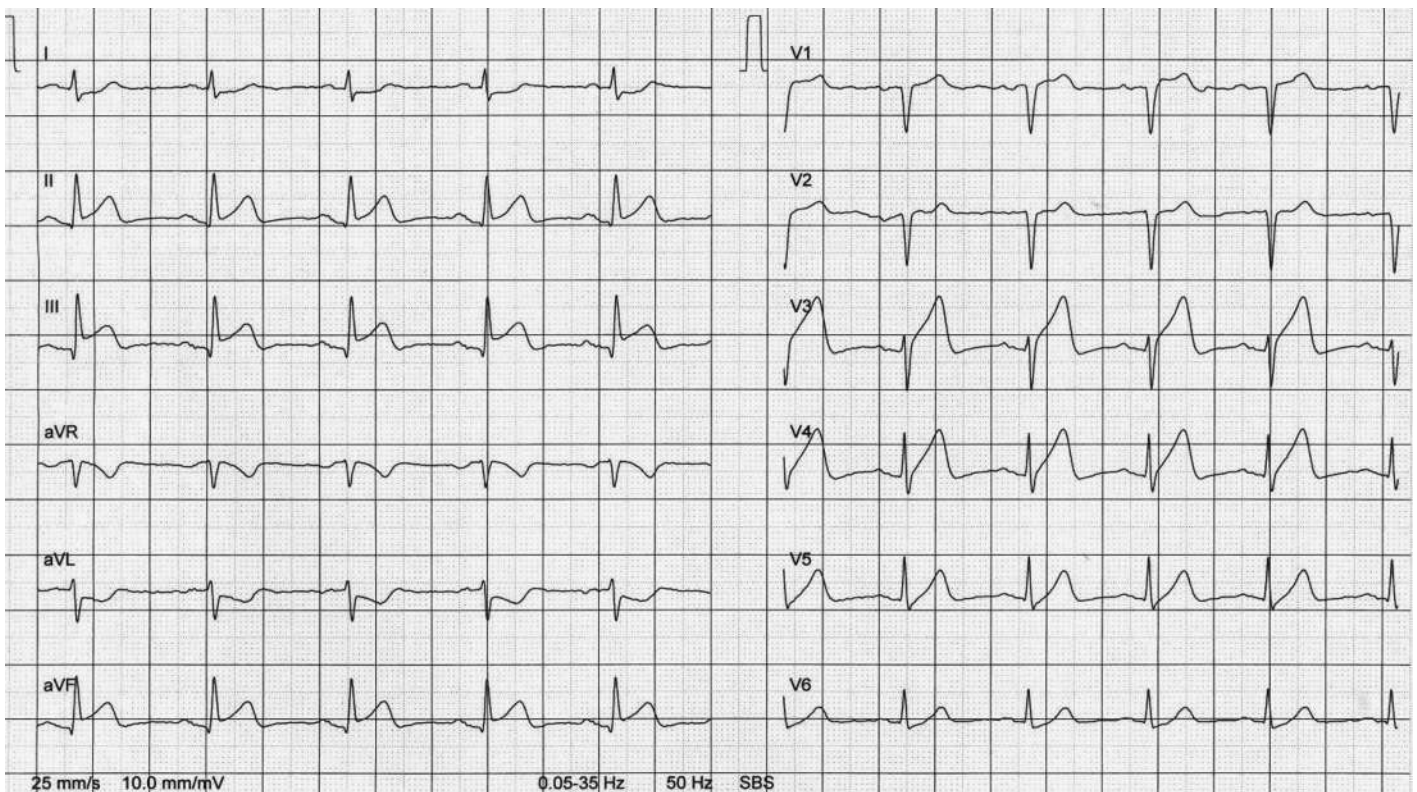


Figure 1: Twelve-lead ECG of the patient on admission.

Comment

The patient's clinical presentation was very typical of acute myocardial infarction, and therefore the primary percutaneous coronary intervention (PCI) team was called immediately after a pre-hospital ECG was available; this looked the same as the ECG shown in figure 1. The unusual finding in the ECG is that there was ST-segment elevation not only in leads II, III and aVF but also in V2–4 (fig. 1). This is not typical for an inferior ST-segment elevation myocardial infarction (STEMI), where ST-segment elevation in leads II, III,

and aVF is typically accompanied by ST-segment depression in leads V1–3 ("posterior ST-segment elevation") if there is a relatively large right coronary artery (RCA) (fig. 2 is an ECG from another patient with classical inferior STEMI). Thus, the widespread ST-segment elevation and the mild PQ/PR depression in leads II, III, and aVF could have led to the idea that the patient had pericarditis rather than a STEMI, and primary PCI might have been deferred. However, there was ST-segment depression in leads I and aVL, which is typical of an inferior STEMI (reciprocal ST-segment depression). In pericarditis, significant ST-segment

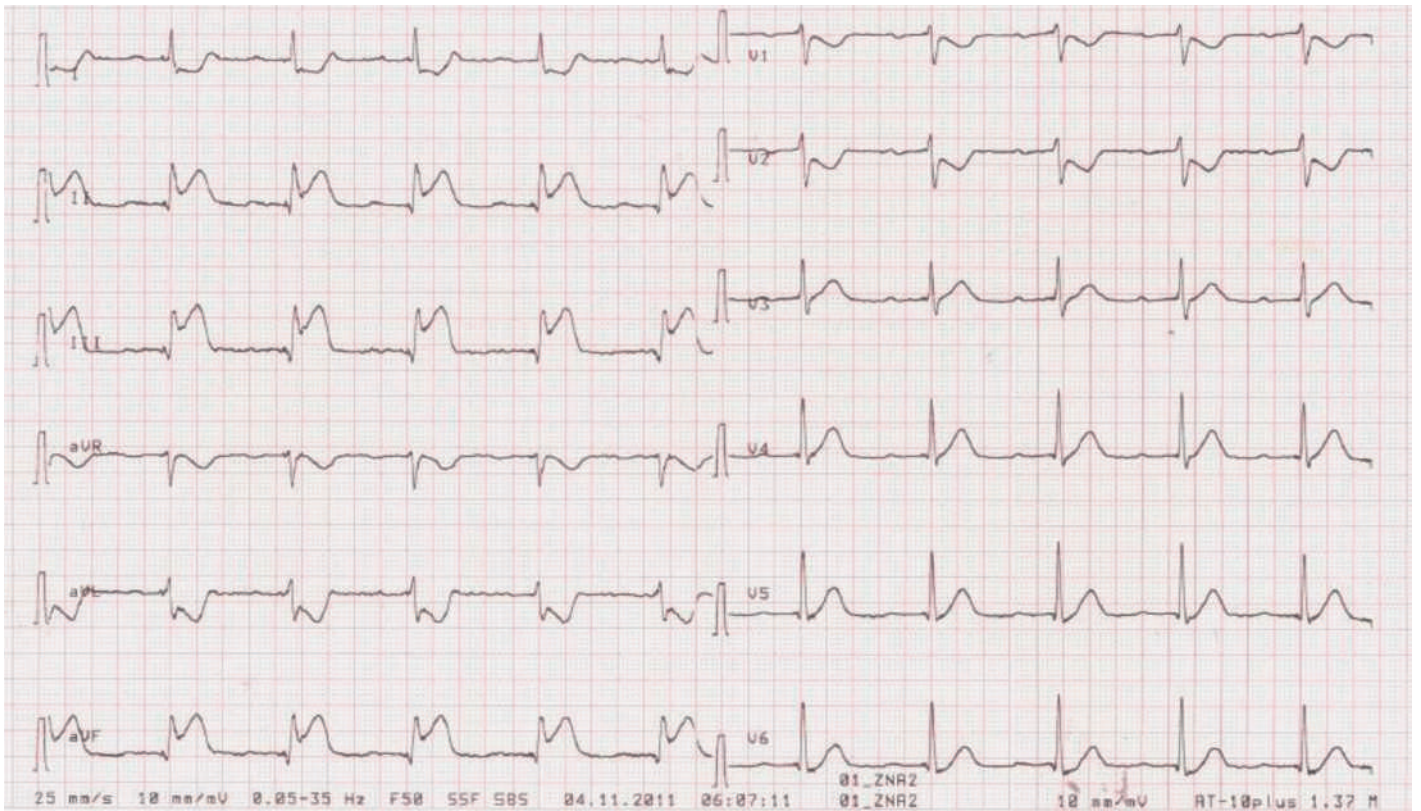


Figure 2: Twelve-lead ECG of another patient with inferior ST-segment elevation myocardial infarction due to acute occlusion of the right coronary artery (RCA) and otherwise normal coronary arteries, showing a typical ECG pattern of an acute RCA infarct.

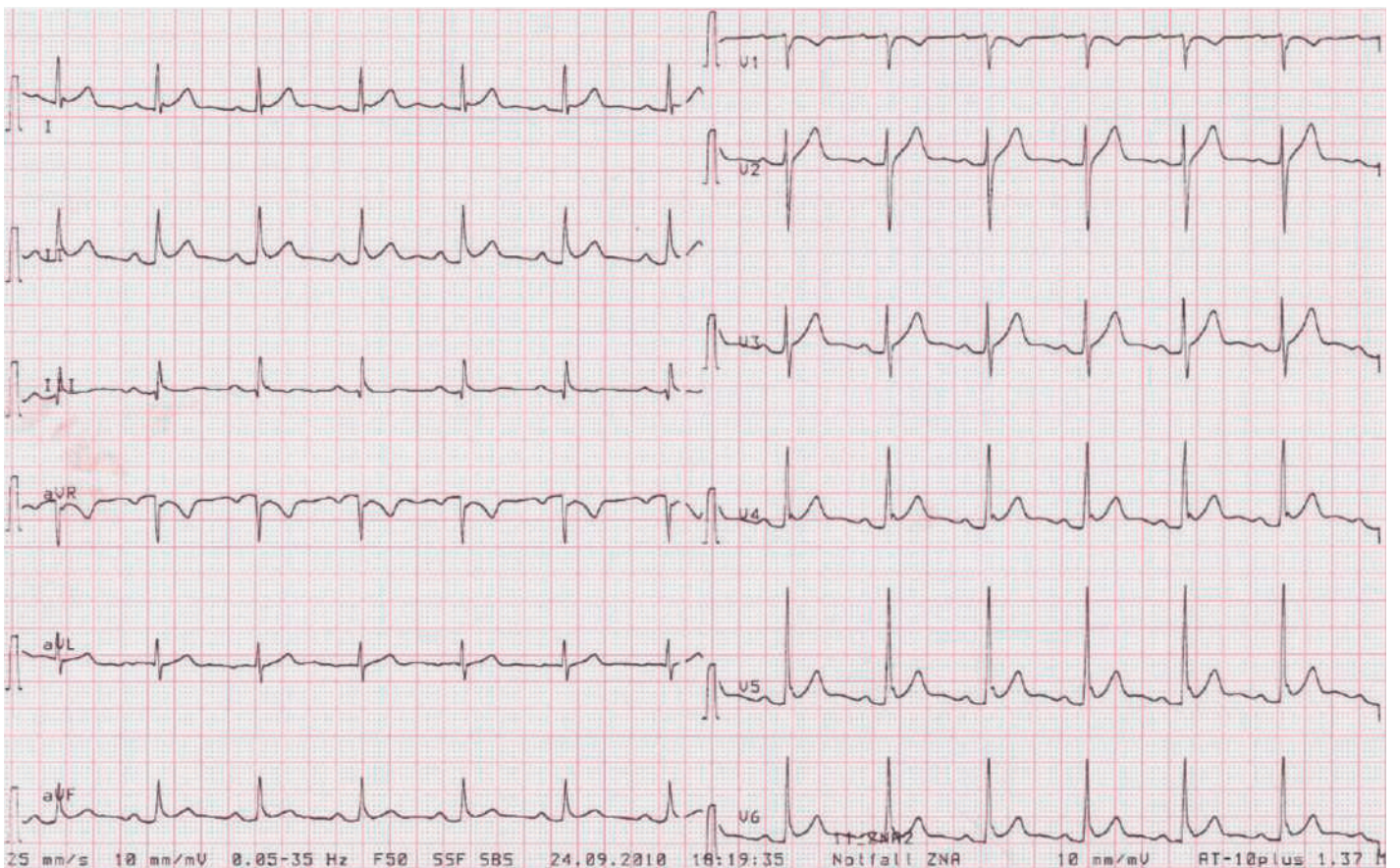


Figure 3: Twelve-lead ECG of a patient with acute pericarditis, with widespread PQ segment depression and ST-segment elevation except in aVR.

depression is extremely uncommon except in aVR and V1 [1]. An example of an ECG of a patient with pericarditis is shown in figure 3. This ECG is characterised by widespread PQ depression and ST segment elevation except in aVR.

Angiography revealed an acute occlusion of the mid RCA (fig. 4 panel A). In addition, there was chronic occlusion of the mid left anterior descending artery (LAD; fig. 4 panels B and D, arrows) just distal to the ostium of a large diagonal branch, which was also significantly stenotic (fig. 4 panels B and C, triangle). Furthermore, the left circumflex artery had two significant stenoses (fig. 4 panels B–D, asterisks).

The RCA was recanalised by use of thrombus aspiration, balloon dilatation and implantation of a drug-eluting stent. The final angiogram (fig. 5 top) demonstrated that the chronically occluded LAD (arrow) was very well collateralised by the RCA. Thus, with the acute occlusion of the RCA there was acute ischaemia in the territories of both the RCA and the LAD. The

LAD was occluded after the origin of the first diagonal branch, and thus there was no ST-segment elevation in leads I and aVL but ST-segment depression in those leads (“reciprocal” to the ST-segment elevation in leads II, III, and aVF). The ECG obtained immediately after PCI revealed significant ST-segment resolution (fig. 5 bottom). A similar ECG could have been recorded in the case of the acute occlusion of a large LAD after the origin of the diagonal branch if the LAD were running around the cardiac apex to the inferior wall, and the RCA were therefore relatively small.

Given this patient’s coronary anatomy, the amount of his myocardium at risk was very large, and thus appropriate interpretation of the ECG and immediate angiography and PCI were absolutely crucial. The peak creatine kinase was 3,191 U/l, and the echocardiogram revealed a left ventricular ejection fraction of 45% the day after PCI. The patient had an uneventful clinical course after PCI and underwent surgery for revascularisation of the left coronary artery.

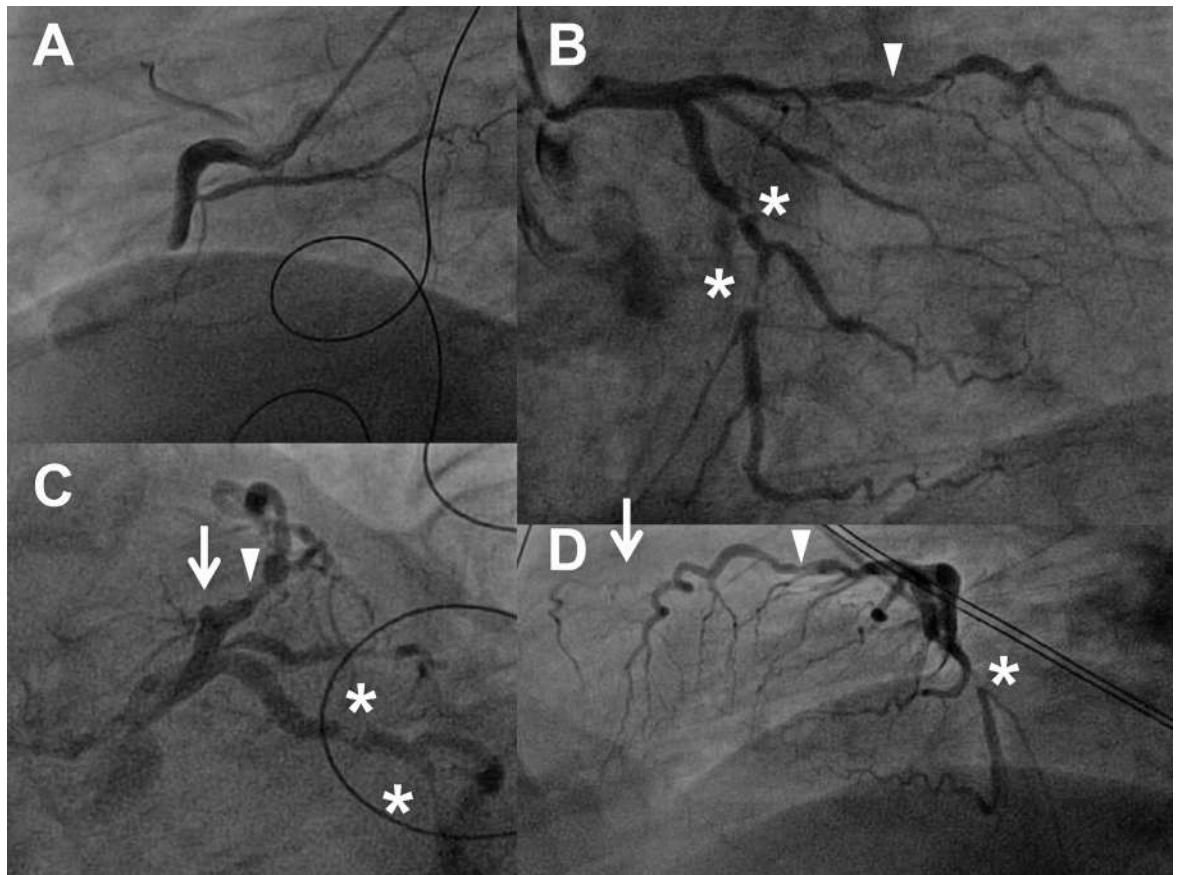


Figure 4: Angiogram before percutaneous coronary intervention. Panel A, left anterior oblique (LAO) 60°: acute occlusion of the mid-right coronary artery (RCA). Panel B, right anterior oblique (RAO) 30°, caudal 20°: left circumflex artery (LCX) with two significant stenoses (asterisks), first diagonal branch with significant lesions (triangle), the left anterior descending artery (LAD) in its typical course is not visible as it is occluded. Panel C, LAO 40°, caudal 30° (“spider view”): chronic occlusion of the mid LAD (triangle), significant stenosis of the first diagonal branch (triangle), two severe stenoses of the LCX (asterisks). Panel D, LAO 90°: the typical clinical course of the LAD is not visible (arrow), i.e. the vessel is occluded, severe LCX stenosis (asterisk).

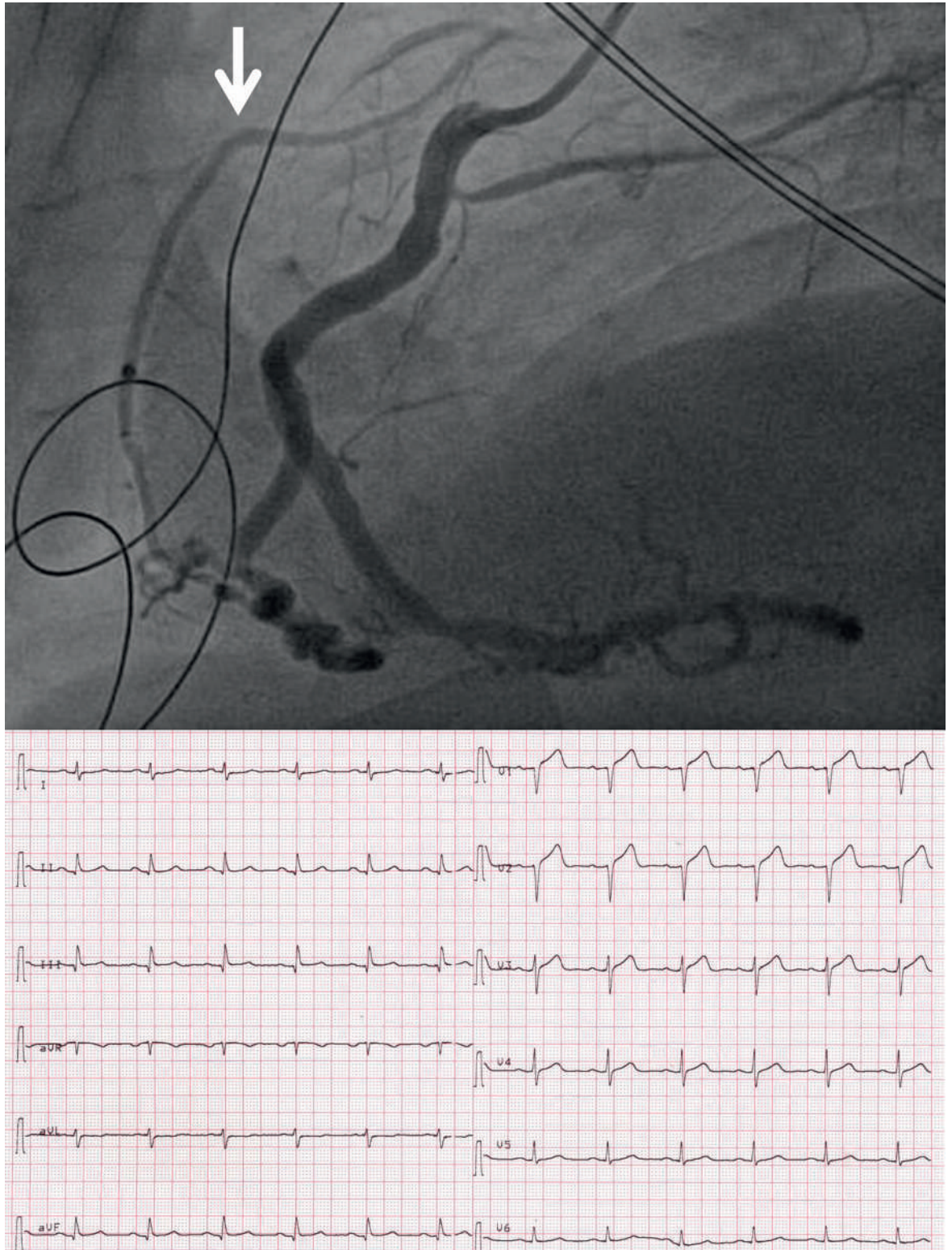


Figure 5: Top: angiogram after percutaneous coronary intervention (PCI) of the right coronary artery (RCA), LAO 90° (same angiographic projection as fig. 3, panel D). The RCA is open, and via the RCA and collaterals the LAD now becomes visible (arrow). Bottom: ECG after PCI.

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Funding / potential competing interests

No financial support and no other potential conflict of interest relevant to this article was reported.

Reference

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