

## When the chest pain suddenly worsens

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### Case presentation

A 76-year-old male presented to the emergency room with a sudden progression of chronic intermittent retrosternal chest pain for 2 hours. The patient's medical history was significant for chronic obstructive pulmonary disease, chronic renal insufficiency and a coronary two-vessel disease with three previous myocardial infarctions. His first heart attack occurred in 1983 with occlusion of the right coronary artery, for which he was treated conservatively. In 2003, an occlusion of the mid circumflex artery was revascularised by stent implantation. His last heart attack occurred in 2006 and was due to occlusion of the first posterolateral branch; it was also treated by stent implantation. The patient's medication included aspirin, lisinopril, bisoprolol, torasemide, atorvastatin and allopurinol. The last transthoracic echocardiography, 1 month before presentation, had shown a severely reduced left ventricular ejection fraction of 29% due to inferolateral akinesia and global left

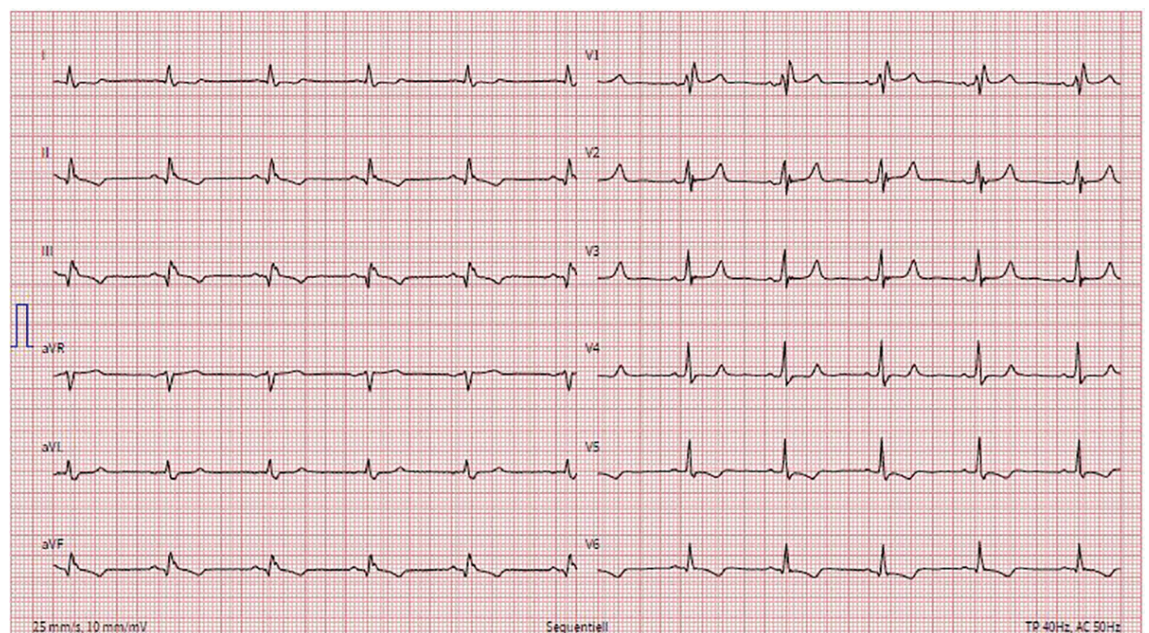
ventricular hypokinesia. His last documented electrocardiogram (ECG) from a previous admission had shown sinus rhythm with a complete right bundle branch block (fig. 1). At the time of presentation, the patient was haemodynamically stable with compensated cardiopulmonary function. His chest pain was at first adequately controlled by intravenous injection of morphine, but showed partial recurrence later. Initial high-sensitive troponin I levels were minimally elevated at 10.4 ng/l. His ECG is shown in figure 2.

**What is your diagnosis? What would be your next step(s) in managing this patient?**

### Solution

The correct diagnosis is acute coronary syndrome with global ischaemia. Note the occurrence of  $\geq 1$  mm depressions of the ST-segment in  $\geq 8$  leads and a sole elevation of the ST-segment in aVR. These findings suggest multi-vessel ischaemia or left main coronary artery obstruction. Such a typical electrocardiographic presentation of global ischaemia should prompt an immediate invasive assessment and revascularisation by primary percutaneous coronary intervention, if feasible [1, 2].

**Figure 1:** Resting-ECG of a 76-year-old patient with known coronary two-vessel disease 1 month before presentation.



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After diagnosis, the patient immediately received heparin and acetylsalicylate intravenously and was transferred to the central hospital for urgent coronary angiography. The coronary angiography revealed three serial critical stenoses in the ostial, proximal and middle left anterior descending coronary artery (LAD) corresponding to the signs of global ischaemia in the ECG. The LAD was the last remaining vessel providing collaterals to the chronically occluded left circumflex and right coronary artery.

Further treatment for this complex coronary three-vessel disease would have been discussed ad-hoc by the heart team. In this case, however, the patient clearly refused the option of a revascularisation by coronary artery bypass grafting. As the LAD stenoses were suitable for percutaneous coronary intervention (PCI), we decided to proceed with revascularisation by PCI. The option of implanting an Impella® device before PCI for short-term mechanical circulatory support in the case of complications was also considered but not deemed necessary due to suitability of the LAD stenoses for PCI, at the discretion of the experienced interventional cardiologist performing the intervention.

The LAD was revascularised with implantation of two drug-eluting stents (fig. 3). An excellent angiographic result was achieved with full perfusion of the LAD (TIMI III flow) and its collaterals to the left circumflex and right coronary artery. The chest pain resolved and the patient remained haemodynamically stable.

The levels of creatine kinase increased to a peak of 331 U/l and high-sensitive troponin I to 8331 ng/l. After the intervention the patient was admitted to our intensive care unit and discharged to the normal ward on the second post-procedural day.

#### Disclosure statement

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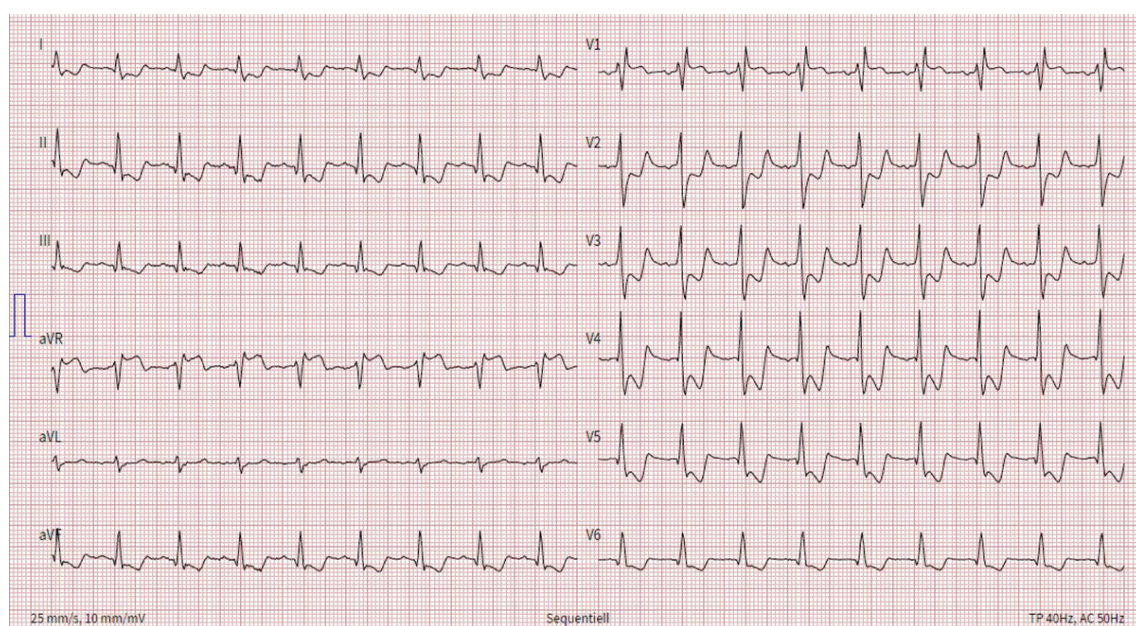
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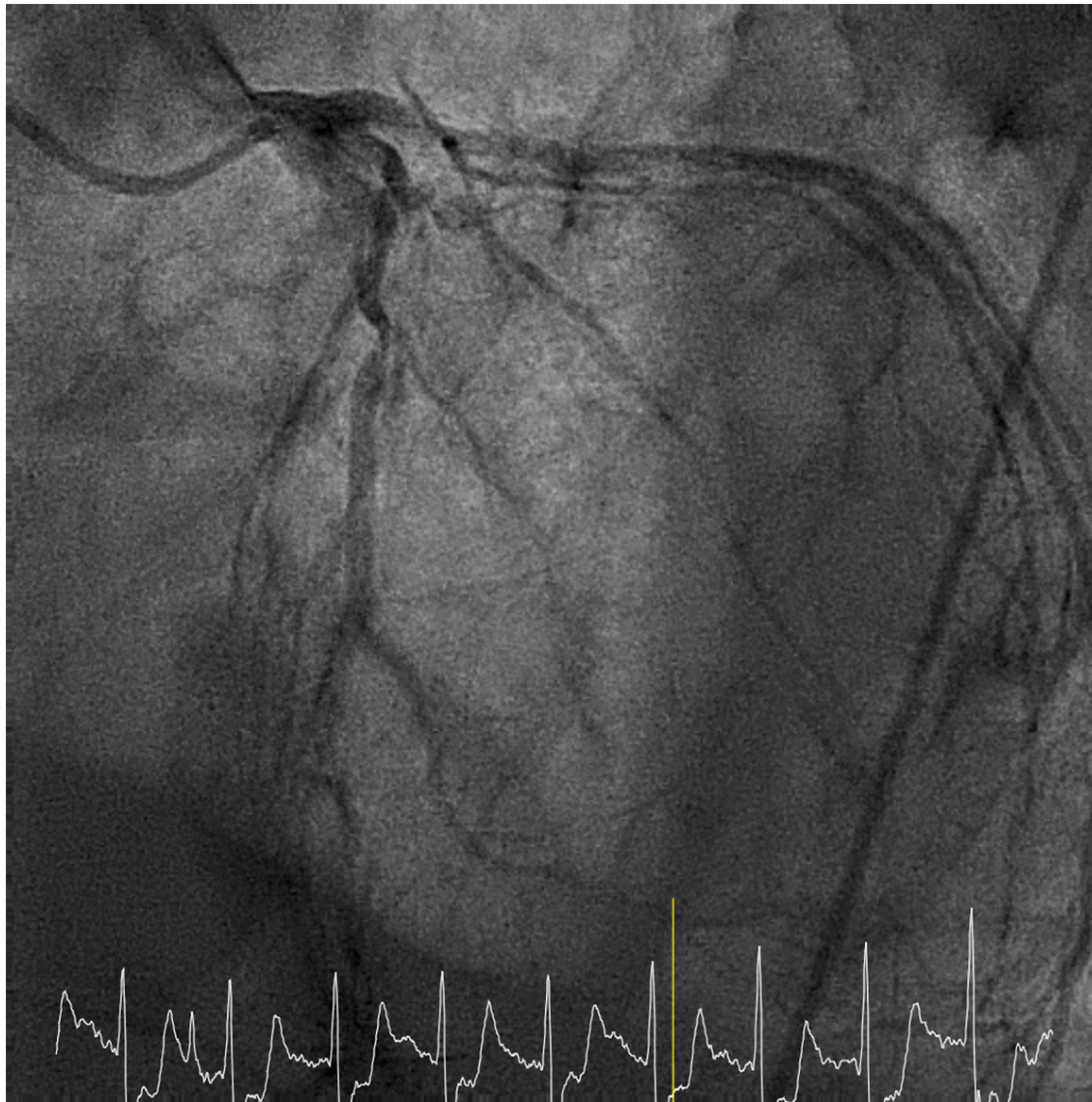
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**Figure 2:** Resting-ECG of the same patient with known coronary two-vessel disease and sudden retrosternal chest pain.





**Figure 3:** Coronary angiography LAO cranial view, showing three serial critical stenosis in the ostial, proximal and mid LAD. Note as well the chronic occlusion of the mid circumflex artery with collaterals. LAD = left anterior descending coronary artery; LAO = left anterior oblique



**Figure 4 :** Coronary angiography LAO cranial view, showing an excellent result after drug eluting stent implantation in the left main stem, ostial, proximal and mid LAD. Note as well the collaterals to the right coronary artery suggesting chronic occlusion. LAD = left anterior descending coronary artery; LAO = left anterior oblique

