Clinical vignette

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Chronic Total Occlusion of Coronary Artery Without Previous History of Myocardial Infarction: A Role Of Spect

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A 69-year-old man with arterial hypertension was admitted because of 30-minute episode of chest pain. His past medical history includes two similar episodes — myocardial infarction (MI) was excluded both times. One month before the admission an angio-computed tomography (angio-CT) of coronary arteries had revealed a total occlusion of the left anterior descending artery (LAD) (Fig. 1). Upon admission, BP was 195/100; the ECG showed a small R-wave progression in the V1–V3 leads. Laboratory test excluded MI. Patient was qualified for invasive coronary angiography which showed occlusion in the mid segment of LAD and insignificant atherosclerotic changes in other coronary arteries. A technetium-99m-methoxy-isobutyl-isonitrile (MIBI) myocardial perfusion SPECT study was performed. The exercise test carried out during SPECT was completed after reaching the target HR with no signs of ischemia. In the exercise SPECT images, a significant perfusion defect was found in the area of the apex, anterior and antero-septal LV wall, which significantly diminished in the rest SPECT (Fig. 2). Stress-induced perfusion defect (ISCH) involved 13% of the LV muscle. Based on these results, an elective LAD recanalization was performed (Fig. 3). In one year observation, there was no recurrence of chest pain, and in MIBI SPECT study; only a mild persistent reduction of perfusion in the previously described LAD territory was observed (Fig. 4).

Chronic total occlusion (CTO) of coronary artery is defined as a complete vessel occlusion and estimated occlusion duration of ≥ 3 months. There are no clear guidelines regarding the treatment of non-acute occlusions and, in spite of a few clinical trials, there is no evidence of the benefit of recanalization of CTO. Because of technical difficulties and higher risk of complications, patients with CTO are qualified for revascularization (REV) less frequently than other groups of patients. Accordingly, SPECT is also less frequently used.

SPECT studies of CTO with no MI history often show a significant degree of ischemia, which indicates that there is preserved tissue viability in the CTO territory. In our material, from the group of patients who had both SPECT and angiography of coronary arteries performed between 2010 and 2017, we selected patients with isolated CTO (without > 50% narrowing of any other coronary vessel) and no history of MI. In each patient (4M, 2F) we found

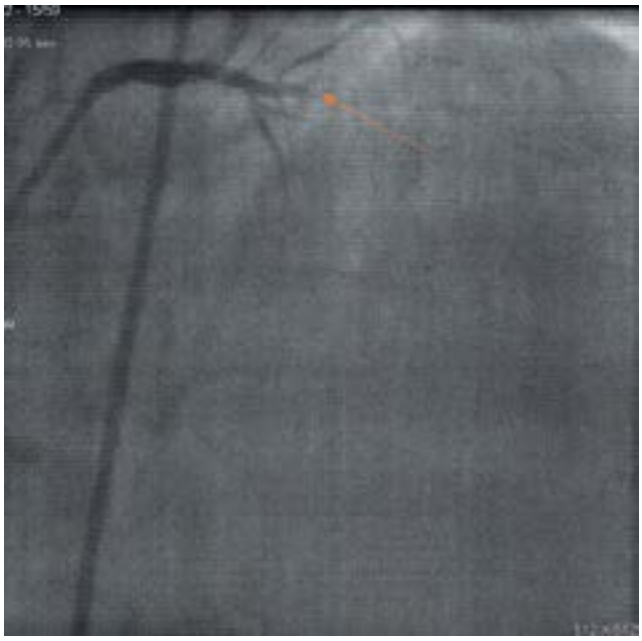


Figure 1. Occluded LAD

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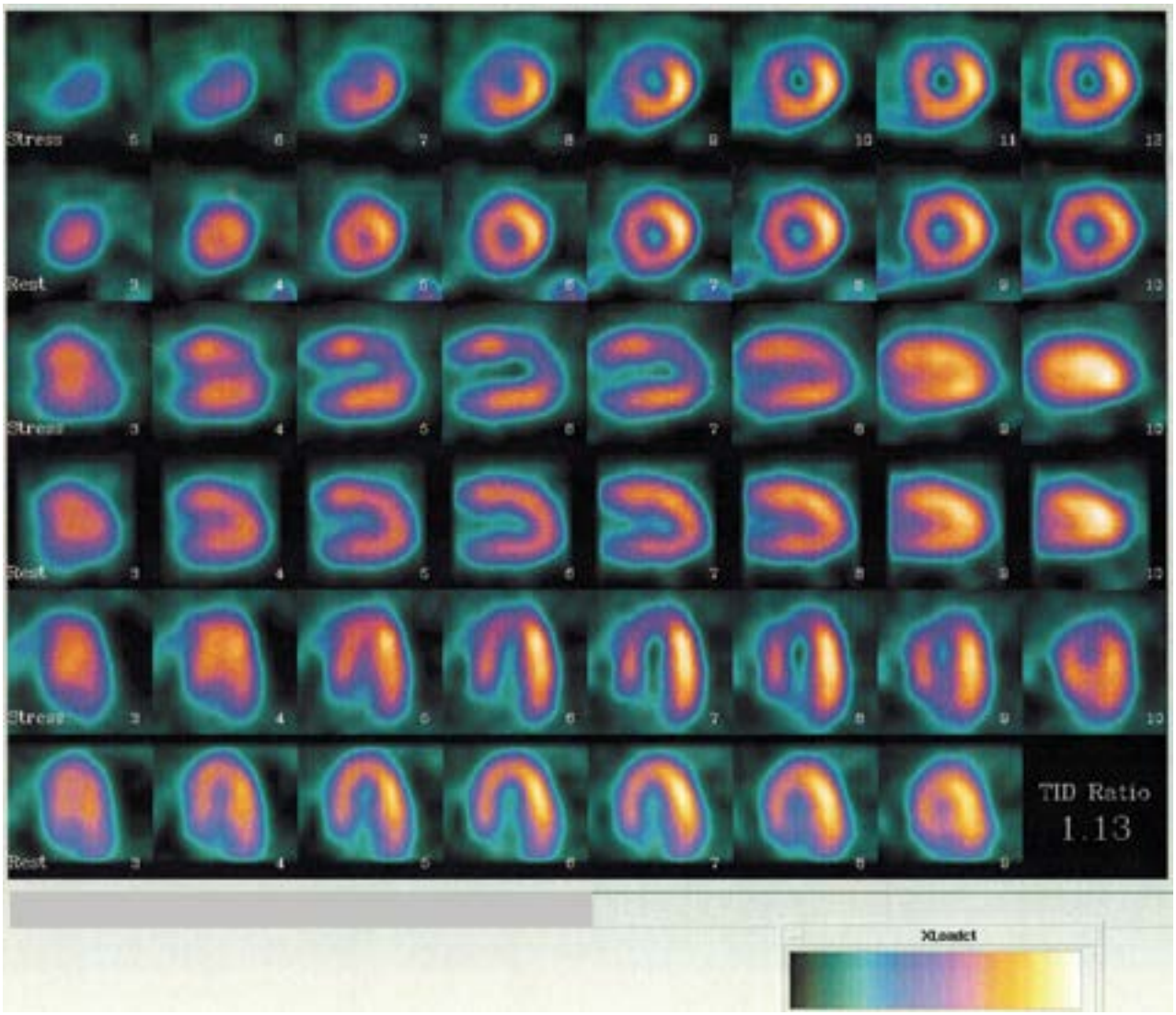


Figure 2. MIBG SPECT: perfusion defect in typical LAD territory



Figure 3. Recanalizated LAD

a transient perfusion defect in the SPECT study in the area corresponding to a typical blood supply of the occluded vessel (av. 11% of LV muscle). In 4 patients (67%), transient perfusion defect was > 10% of the LV muscle.

It seems that the presence of ISCH (not necrosis) is associated with the development of collateral circulation, owing to the chronic nature of the disease. SPECT studies help to select patients who will potentially benefit the most from REV: in our observation, 2/3 of patients had significant ischemia in the territory of CTO, which might require REV.

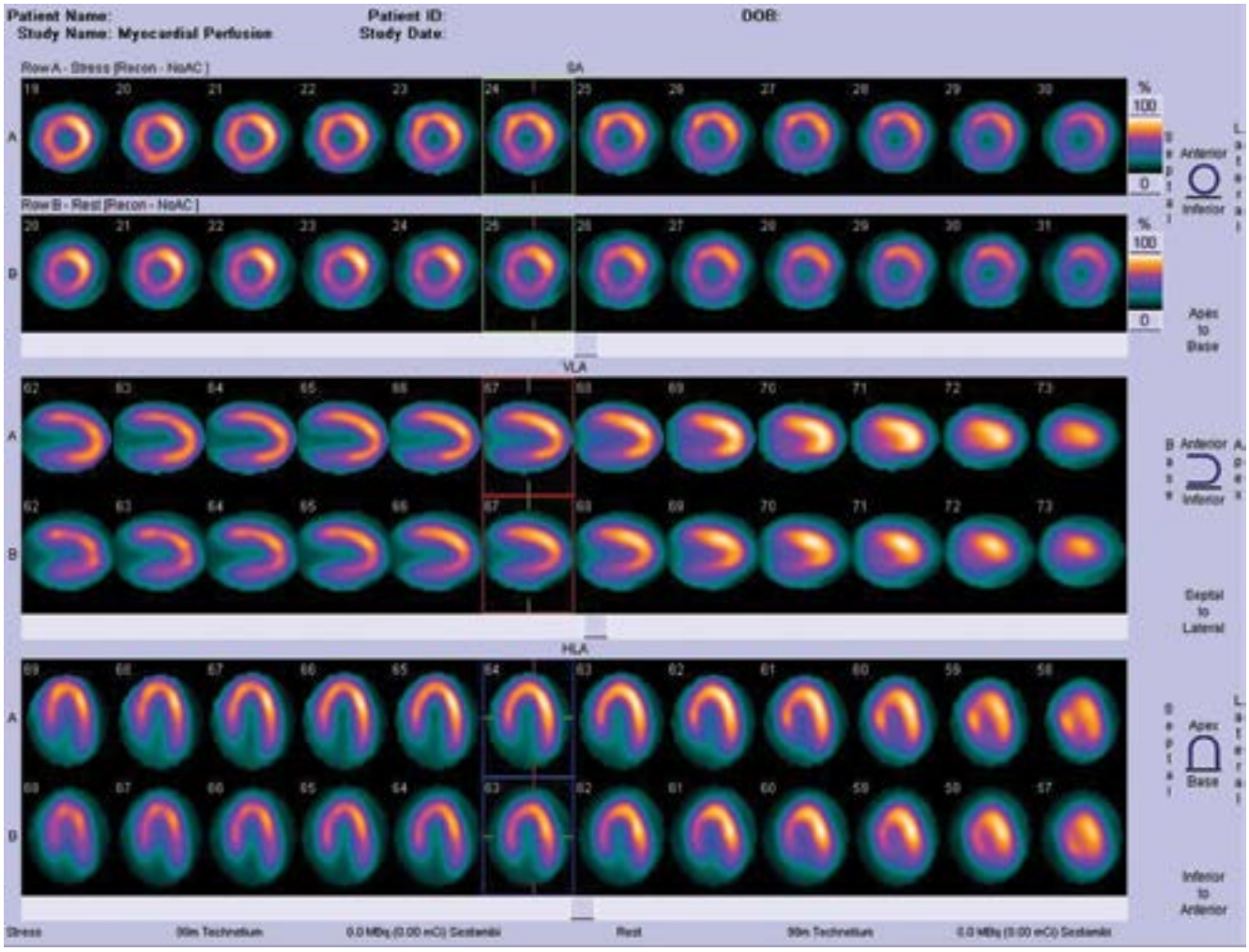


Figure 4. MIBI SPECT after 1 year