Cardiac Imaging

Ulcerated Atheromatous Plaque of the Left Main Coronary Artery in a Patient with a Recent Extensive Anterior Myocardial Infarction

Georgios Lazaros, Eleftherios Tsiamis, Georgios Metallinos, Christodoulos Stefanadis

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

Key words: **Ulcerated atheromatous plaque, main coronary artery, myocardial infarction.**

Manuscript received: February 28, 2007;
Accepted: March 30, 2007.

Address:
Georgios Lazaros

31 Achilleos St., 175 62 P. Faliro, Athens Greece
e-mail: glaz35@hotmail.com

A 55-year-old man, a current smoker with a history of arterial hypertension and dyslipidaemia, was admitted to our department for a scheduled coronary angiographic examination. Two months before entry, the patient had been admitted to another hospital for an extensive anterior myocardial infarction, treated with intravenous thrombolysis. The coronary angiogram recorded one week after the acute infarction depicted an ulcerated atheromatous plaque in the left main coronary artery, along with subtotal occlusion of the left anterior descending artery in its proximal part, and non-significant stenoses in the (dominant) circumflex, one before the origin of the first obtuse marginal branch and another in its peripheral part. The right coronary artery was a small vessel without stenoses, while left ventriculography showed akinesis of the anterior wall of the left ventricle, with an apical aneurysm and severely impaired contractility (ejection fraction ~30%). A cardiac surgical evaluation, requested by the treating cardiologist, recommended conservative treatment, given that the residual lumen and the flow in the left main coronary artery were very satisfactory.

During the postinfarction period the patient reported exertional dyspnoea and moderate fatigue, without, however, typical anginal discomfort. The echocardiographic examination revealed akinesis and thinning in the region supplied by the left anterior descending artery, while a dobutamine stress echo test showed no viability in that region, nor any evidence of ischaemia in the other myocardial territories, during infusion of maximal dobutamine dose. A coronary angiographic examination was then performed for re-evaluation of the atheromatous plaque in the left main coronary artery and again showed a crater-like formation in the middle part of the vessel, communicating with the lumen via a thin stem (Figures 1, 2). The dimensions and morphology of the structure did not differ from the previous angiogram, while its external boundary, on cine-angiography, was seen to be a continuation of the adventitia of the left anterior descending artery, a finding strongly suggestive of an ulcerated atheromatous plaque. The left anterior descending artery, in contrast to the initial study, was patent, with a stenosis of approximately 85%, while the findings in the remaining vessels were unchanged. From a comparative study of the two successive angiograms we speculated that rupture of the atheromatous plaque in the main coronary artery had contributed to the complete embolic occlusion of a critically stenotic left anterior descending artery, which on the second angiogram, as stated above, was patent although stenotic.

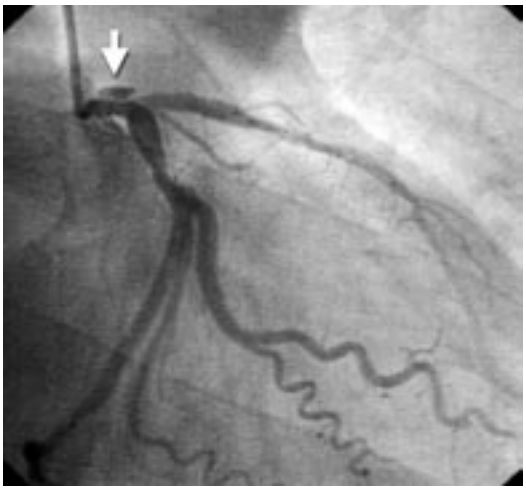

Figure 1. Right anterior oblique (30˚) projection, showing a crater-like, ulcerated atheromatous plaque in the left main coronary artery, communicating with the lumen via a thin stalk (white arrow).

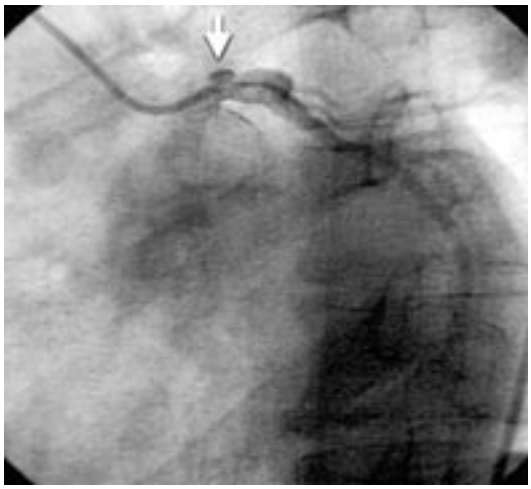

Figure 2. The same structure in the left anterior oblique (60˚) projection.

Apart from the interesting imaging aspect, this case is presented because of the therapeutic dilemma it posed. The possible choices of treatment included either conservative or invasive, with aortocoronary bypass or angioplasty of the main coronary artery, chiefly for the 'protection' of the left circumflex artery, given that the anterior wall showed no signs of myocardial viability. Aortocoronary bypass was ruled out at this point, mainly in view of the very satisfactory flow in the residual lumen of the left main coronary artery in combination with the absence of significant stenoses in the other vessels. Those circumstances would reduce the likelihood of an arterial graft functioning adequately, because of competing flow from the native vessel. In addition, bypass of the plaque would not provide protection against possible peripheral embolisation of atheromatous material from the ulcerated plaque, and in any case, the patient did not wish to undergo cardiac surgery. Angioplasty with a coated stent (autologous arterial-venous graft-covered stent, or other material) has been used successfully in cases of aneurysm, coronary artery rupture, etc., and would have been an alternative therapeutic approach in our patient.[1-3] However, here, too, there are serious reservations concerning possible restenosis, taking into account that data concerning the long-term results of implantation of these stents in the left main coronary artery are lacking. Finally, it should be noted that in obstructive lesions of a main coronary artery, of uncertain functional significance, intravascular ultrasound (IVUS) could be of great assistance in determining therapeutic strategy. It appears that patients with a functional lumen area >7.5 mm^2 can safely be treated conservatively.[4] In the present case an IVUS study was not performed, as the functional test had ruled out the existence of viable myocardium in the region perfused by the left anterior descending coronary artery, as well as ischaemia in the posterolateral wall supplied by the circumflex artery, even though the maximum predicted heart rate was achieved (~ 165 beats/min during dobutamine infusion of 40 μg/kg/min).

After the patient had been briefed, conservative treatment was decided upon initially. The patient was already on double antiplatelet medication (aspirin and clopidogrel). Anticoagulants were not prescribed, since the literature does not document any benefit from their preventive administration. The patient remains free of events at three-month follow up.

References

1. Tsiamis E, Toutouzas K, Stefanadis C: Eight-year clinical and angiographic follow-up after implantation of autologous arterial graft covered stent in a de novo thrombus-containing lesion. Catheter Cardiovasc Interv 2005; 66: 199-202.
2. Stefanadis C, Toutouzas K, Tsiamis E, Toutouzas P: New stent design for autologous venous graft-covered stent preparation: first human application for sealing of a coronary aneurysm. Catheter Cardiovasc Interv 2002; 55: 2222-2227.
3. Stefanadis C, Toutouzas K, Tsiamis E, et al: Implantation of stents covered by autologous arterial grafts in human coronary arteries: a new technique. J Invasive Cardiol 2000; 12: 7-12.
4. Fassa AA, Wagatsuma K, Higano ST, et al: Intravascular ultrasound-guided treatment for angiographically indeterminate left main coronary artery disease: a long-term follow-up study. J Am Coll Cardiol 2005; 45: 204-211.