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## Case report

# Stent graft implantation in spontaneously recanalized LIMA graft after redo coronary bypass operation



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## ABSTRACT

The authors present the case of a male patient who sustained posterobasal myocardial infarction and one year later for three vessel disease a coronary bypass operation with three anastomoses (including LIMA-LAD and vein grafts) was performed. After 13 years repeat coronary angiography showed patent LIMA graft besides occluded vein grafts and native coronary vessels. Since attempt for recanalization of a venous graft was unsuccessful subsequent redo bypass surgery was performed substituting the occluded grafts with a sequential vein. On the fourth postoperative day chest pain and ST changes on the ECG developed and the acute re-catheterization showed the occlusion of the LIMA-LAD bypass while the vein graft was patent therefore RIMA was anastomosed to LAD without ECC urgently in the operating room. Two years later subsequent coronary angiogram due to reoccurrence of angina symptoms proved recanalization of the LIMA graft with significant stenosis at the site of the occlusion. RIMA-LAD bypass was patent showing only unsatisfactory filling to the distal part of the LAD. For this reason a 3/26 mm Jostent GraftMaster stent graft was implanted into the recanalized but stenosed part of the LIMA bypass with excellent angiographic result. After 6 months of the intervention the patient was free of angina at the follow up. To the best of our knowledge, this is the first reported case of spontaneous recanalization of an occluded internal mammary graft.

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The authors present the case of a male patient born in 1942. He was on pharmacological antihypertensive treatment since 1985 and suffered from angina pectoris since 1987. He sustained a posterobasal myocardial infarction in 1989. In this year coronary angiography revealed three vessel disease,

therefore a coronary bypass operation with three anastomoses (LIMA-LAD, SV-OM, SV-RCA) was performed in 1990. From the year 2000 his diabetes mellitus required oral treatment. After recurrent severe angina and positive stress test repeat coronary angiography in 2003 showed patent LIMA graft

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besides occluded vein grafts and native coronary vessels. Attempt for recanalization of a venous graft was unsuccessful. For this reason subsequent redo bypass surgery was performed substituting the occluded grafts with a sequential vein. On the fourth postoperative day chest pain and ST changes on the ECG developed and the acute re-catheterization showed the occlusion of the LIMA-LAD bypass while the vein graft was patent. No attempt for opening the left mammary artery was carried out in the cath lab but RIMA was anastomosed to LAD without ECC urgently in the operating room.

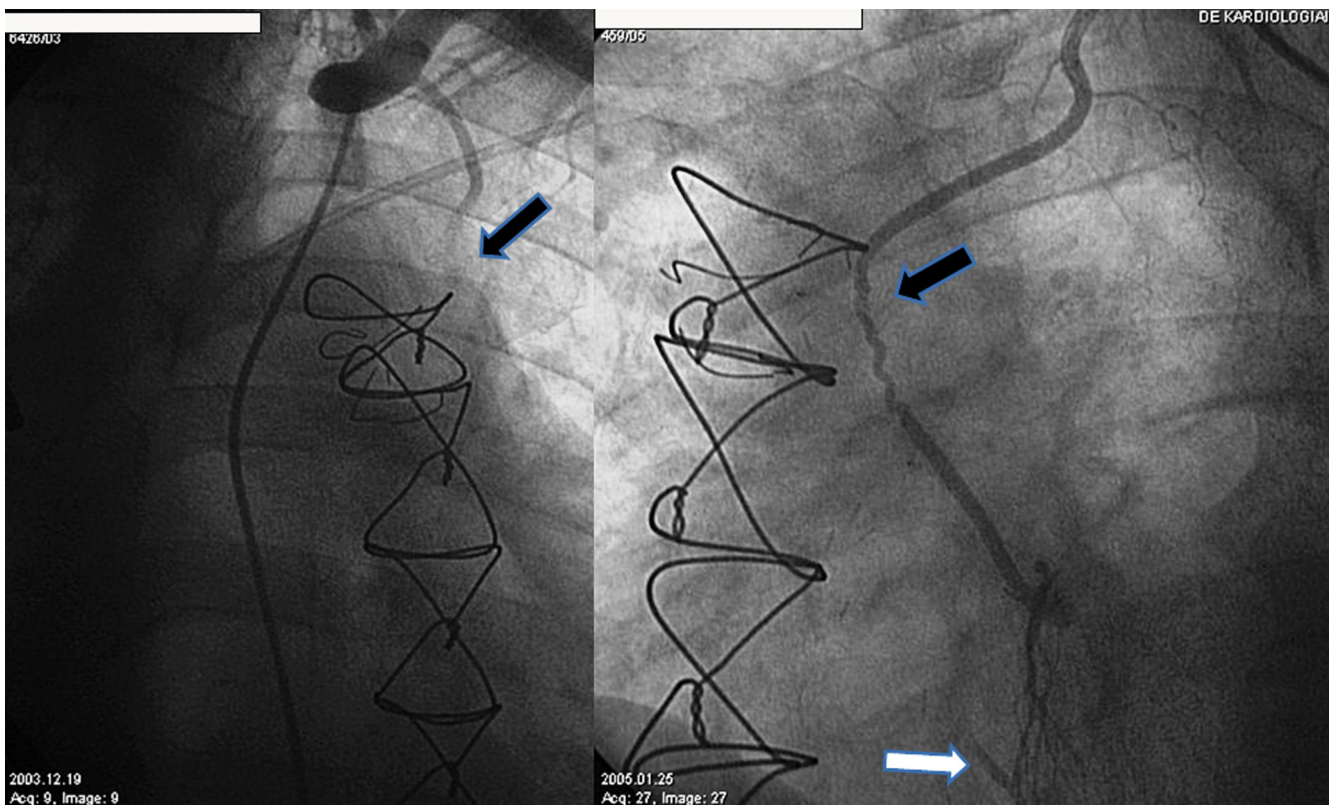
In 2005 the patient was hospitalized due to reoccurrence of angina symptoms. Myocardial perfusion SPECT showed severe reversible perfusion defect in the territory of the LAD. Subsequent coronary angiogram unexpectedly proved recanalization of the LIMA graft with significant stenosis at the site of the occlusion with irregular lumen surface (Fig. 1). The RIMA-LAD bypass was patent but showed only thin filling to the distal part of the LAD. A 3/26 mm Jostent GraftMaster stent graft was implanted into the recanalized but stenosed part of the LIMA bypass with excellent angiographic result (Fig. 2). After 6 months of the intervention the patient was free of angina at the follow up.

Redo cardiac operations with patent LIMA-LAD bypass are technically always challenging. During aortic cross-clamp the LIMA has to be occluded temporarily therefore the surgeon must find and isolate the vessel without inducing any injury. In our case the LIMA graft was free prepared and occluded with a 'bulldog' clamp as routinely performed in the majority of cases in our department. Postoperative occlusion of the

LIMA after redo surgery could have been caused by the clamping and this possibility was also supported by the repeated coronary angiography.

Nevertheless, temporary occlusion of the LIMA graft is one of the pivotal points of redo operations hence the method should be considered in advance. The applied procedure can be surgical using the above mentioned bulldog clamp or soft vascular rubber band combined with isolation of the graft amongst other methods. Another possibility is a temporary balloon occlusion of the LIMA with percutaneous technique [1] necessitating preoperative placement of an angioplasty balloon into the graft and meticulous determination of the occlusion threshold. The balloon is inflated subsequently intraoperatively for the duration of the aortic cross-clamping. Both surgical and transcatheter methods involve the risk of a potential LIMA injury and dysfunction of various severity and appearance. However as presented above, any harm to a patent graft can cause serious complications and can jeopardize the success of the operation highlighting the importance of a careful and rational decision making in every case.

Spontaneous recanalization of an occluded internal mammary graft [2–4] is a rare phenomenon and to the best of the knowledge of the authors it has not been published after total occlusion of a LIMA graft associated with intraoperative clamping during a redo bypass surgery. Generally the total occlusion or the atresia of the LIMA graft (string sign phenomenon) can be observed due to anastomotic failure, weak graft material, serious competitive flow or undiscovered subclavian stenosis [5]. Fundamentally, intravascular pressure



**Fig. 1** – The occluded and then spontaneously reopened LIMA graft is indicated by the black arrows. White arrow shows the retrograde filling of the patent RIMA-LAD bypass.

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