

How to recycle a misused left internal thoracic artery: Tips and tricks

Monica Contino MD¹  | Massimo G. Lemma MD, PhD, FETCS² |
 Andrea Mangini MD, PhD¹ | Claudia Romagnoni MD¹  | Paolo Vanelli MD¹ |
 Carlo Antona MD³

¹Division of Cardiac Surgery, Department of Cardio-Vascular Surgery, ASST Fatebenefratelli-Sacco, Milan, Italy

²Department of Cardiac Surgery, The Jilin Heart Hospital, Changchun City, Jilin Province, China

³Dipartimento di Scienze Biomediche e Cliniche "L. Sacco", Università degli Studi di Milano, Milan, Italy

Correspondence

Monica Contino, Division of Cardiac Surgery, Department of Cardio-Vascular Surgery, ASST Fatebenefratelli-Sacco, Via G.B. Grassi 74, 20157 Milan, Italy.

Email: monica.contino@gmail.com

Abstract

In this case report, we describe how to recycle the left internal thoracic artery (LITA) when misused but not damaged. Eight years after a left anterior small thoracotomy followed by left anterior descending (LAD) stenting for STEMI in first postoperative day, a 67-years-old woman had an NSTEMI with angiographic evidence of intrastent re-stenosis with a perfectly patent LITA, harvested only from the fourth to the sixth intercostal space. During redo surgery, LITA was harvested as a pedicle from the anastomosis to the fourth intercostal space and primarily from the first to the fourth intercostal space. Special attention was paid at the level of the fourth intercostal space where the vessel was stuck to the sternum: a 15-blade was used being scissors or cautery too dangerous. At the end of harvesting, the LITA was full-length available for a new coronary anastomosis on LAD, distal to the previous one.

KEYWORD

coronary artery disease

1 | INTRODUCTION

Left internal thoracic artery (LITA) is the gold standard for left anterior descending (LAD) artery revascularization about long-term patency.¹ When misused but not damaged, LITA can be still considered as a graft, in case of redo surgery. In this manuscript, we describe how to recycle LITA after a previous left anterior small thoracotomy (LAST) operation.²

2 | CASE REPORT

Institutional review board approval, consent statement, and clinical trial registration: N/A. A 67-years-old woman came to our attention for non-ST elevation myocardial infarction. Her comorbidities were:

arterial hypertension, active smoking, and diabetes mellitus. Eight years before she had undergone a LAST operation in another hospital, complicated by ST-elevation myocardial infarction in the first postoperative day, due to LAD occlusion distal to the anastomosis, that was treated with LAD direct stenting. The coronary angiogram showed intrastent re-stenosis on LAD; the LITA was perfectly patent and looking at the vessel course it was evident that it had been harvested only for a very short portion, from the fourth to the sixth intercostal space (see Video S1). During the 8 years after the first surgery, the patient developed also circumflex coronary artery disease and severe aortic stenosis. The patient was scheduled for dual coronary artery bypass grafting (CABG) and aortic valve replacement. We decided to use the saphenous vein for the marginal branch and to recycle the partially harvested LITA for the LAD. After median sternotomy, adhesions were lysed and the pericardium was opened

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so that we could identify the LITA–LAD anastomosis. The LITA was first harvested as a pedicle from the coronary anastomosis to the fourth intercostal space and then primarily from the first to the fourth intercostal space: in this tract the vessel still appeared in its original anatomical position, following its normal course. Special care was used at the level of the fourth intercostal space, the LITA hinge point, where the vessel was stuck to the sternum: a 15-blade was used to separate the arterial graft from the internal chest wall, being scissors or cautery too dangerous for the purpose (see Video S2).

After harvesting, the LITA was completely undamaged and full-length available for a new coronary anastomosis. First of all, a composite Y-graft between LITA and a saphenous vein was achieved. Despite the patient young age, we choose a saphenous vein instead of the right internal mammary artery since the patient was diabetic and an active smoker and we want to reduce the risk of sternal wound complications. Cardiopulmonary bypass was then started, the ascending aorta cross-clamped and the anastomosis between the saphenous vein and the marginal branch performed. After that, LITA was detached from the previous anastomosis on the LAD and its distal part was cut because of vessel wall thickening; the flow was checked and found excellent. After the closure of the previous anastomotic site, an incision was made on the LAD two centimeters distally to the previous anastomosis; a 1.2-mm coronary probe showed a perfect patent distal LAD and a proximal stop corresponding to the previous anastomotic site. LITA–LAD anastomosis was then performed using a 7/0 polipropilene suture. Finally, the aortic valve was replaced with a bio-prosthesis number 19.

3 | CONCLUSIONS

Partial LITA mobilization (harvesting of a 4–5 cm portion) has been proposed during LAST operation to avoid costal cartilage excision and reduce postoperative pain due to intercostal nerves damage.² Nevertheless, this procedure shows a few critical disadvantages because the partial harvested LITA can take an uncorrected course. The free segment is usually short and the graft appears as a straight line between the chest and the coronary anastomosis (Figure 1) with possible hypo-perfusion of the LAD due to the acute LITA angle along its course. Moreover, excessive graft tension is possible during lung expansion, with potentially dreadful consequences.

Redo CABG can present the issue of graft availability. LITA recycling can be a valid option, assuming that two conditions are met: first of all, LITA must be uninjured; secondarily LAD must present stenosis only in the peri-anastomotic area.³ This procedure is technically demanding but gives to the patient all the advantages of LITA long-term patency. Follow-up at mid and long-term after LITA recycling shows good results.⁴

In conclusion, we can affirm that LITA recycling should be considered a good option in redo patients when the former operation was the LAST procedure with partial LITA harvesting and the



FIGURE 1 Image of preoperative LITA angiography: you can appreciate the course of the vessel, only partially harvested. LITA, left internal thoracic artery

presence of isolated peri-anastomotic LAD stenosis if the vessel is uninjured certainly. In fact, as described by Calafiore,² usually the artery has been harvested only for a short segment (4–5 cm) from the inferior border of the third intercostal space up to the superior border of the fifth costal cartilage.

The coronary angiogram must be carefully analyzed before LITA recycling to identify the length of previous LITA harvesting: despite the shorter the harvesting, the easier will be the recycling procedure, the short LITA harvesting is not the standardized technique, but this was the choice of the surgeon who performed the first procedure.

We underline the importance of complete LITA harvesting during a left mini-thoracotomy approach. A full-length harvested LITA allows also the creation of a composite graft to bypass the obtuse marginal branches and/or the posterior descending coronary artery, for complete no-touch aorta revascularization through a minimally invasive incision.⁵

CONFLICT OF INTERESTS

All the authors declare that there are no conflict of interests.

ORCID

Monica Contino  <https://orcid.org/0000-0002-2614-2168>

Claudia Romagnoni  <https://orcid.org/0000-0001-9971-8845>

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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