anticoagulant-induced liver injury after cardiac massage by sternal compression [6, 7].

The mortality rate of acute PE has been reported to be 65% in cases requiring emergent embolectomy [8]. In this case, we were able to successfully resuscitate and treat the patient despite the complication of massive intraperitoneal bleeding. Performing a minimally invasive interventional embolization of a bleeding peripheral hepatic artery allowed us to perform the pulmonary embolectomy promptly. Emergent pulmonary embolectomy was performed to wean the patient from extracorporeal membrane oxygenation and to discontinue the anticoagulation as quickly as possible, in consideration of the intraperitoneal bleeding. We performed the interventional embolization before the pulmonary embolectomy, given that interventional embolization could be performed more quickly than direct repair for multiple bleeding hepatic arteries. Suspecting that the bleeding was due to cardiopulmonary resuscitation, we performed hepatic hemostasis with only gauze packing, confirming hemostasis 2 days later. Despite life-threatening complications compounding critical illness, appropriate decision making regarding intervention and sequence enabled us to treat and discharge this patient without major neurologic sequelae.

References

Upgrading Redo Coronary Artery Bypass Graft by Recycling In Situ Arterial Graft

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We present a case of redo coronary artery bypass grafting (CABG) in which a single internal thoracic artery (ITA) graft was upgraded to a bilateral ITA graft by recycling a...
left ITA graft, anastomosed to the left anterior descending artery in primary CABG performed 17 years previously. During redo CABG, we dissected the left ITA, reused it in situ for the circumflex artery, and used the right ITA to the left anterior descending artery for a bilateral ITA graft. All grafts remained patent 2 years after redo CABG. Recycling ITA grafts may enable upgrading to bilateral ITA grafting during redo CABG.


Bilateral grafting of the internal thoracic artery (ITA) in coronary artery bypass grafting (CABG) is superior to single grafting of ITA in terms of patency, freedom from arteriosclerosis, and survival benefit [1]. However, it is difficult to perform bilateral ITA (BITA) grafting in redo coronary artery bypass grafting (CABG) because of a lack of available bypass conduits. Here, we describe a successful upgraded BITA grafting pattern by recycling a left internal thoracic artery (LITA) graft in redo CABG.

A 70-year-old man presented with breathlessness upon exertion1 year before reoperation. He had undergone emergent CABG 17 years ago with a LITA bypass to the left anterior descending artery (LAD) and sequential bypass using a saphenous vein graft to the circumflex and right coronary arteries. Coronary arteriography revealed 90% stenosis of the LAD, the first diagonal branch, and the distal right coronary artery, total occlusion of the circumflex branch, and 75% stenosis of the proximal right coronary artery. The saphenous vein graft was totally occluded, and the LITA graft was patent but exhibited 75% stenosis at the anastomotic site (Fig 1). The stenotic lesions of the right coronary artery and the diagonal branch indicated that atherosclerosis had progressed in the native coronary vessels. The patient was therefore admitted to our facility for redo CABG.

We performed a left anterior minithoracotomy and partially resected the second rib to dissect the patent LITA graft. This procedure prevented injury to the graft that could have occurred during median resternotomy because the grafted LITA lay in the midline at the second intercostal space, very close to the sternum (Fig 2). The graft was carefully dissected from the sternum in this position; then we performed a median resternotomy. Thereafter, the right ITA (RITA) was harvested, and the rest of the LITA in the pericardium was re-harvested up to the point of its anastomoses. The RITA graft was anastomosed 10-mm distal to the previous anastomosis site in the LAD. The LITA, still in situ, was then ligated at the proximal portion of its anastomosis and trans- ected. This recycled LITA was anastomosed to the circumflex coronary artery. By using the skeletonizing method for re-harvesting the LITA, the graft could reach a distal portion of the coronary anatomy without tension. The saphenous veins were used as grafts for the distal right coronary artery and the diagonal branch from the ascending aorta. This procedure was performed by off-pump technique.

The postoperative course was uneventful. On postoperative day (POD) 10, computed tomography was performed to evaluate graft patency (Fig 3). At 2 years after surgery the patient is well, and computed tomography
showed that the recycled LITA graft remained patent with no problems after being used as a graft conduit for 19 years (Fig 4).

Comment

Although redo CABG can be performed safely in certain patients, the morbidity and mortality of such procedures are higher than those of primary procedures [2]. The technical demands of redo surgery include successful reentry into the chest, management of patent bypass grafts, and finding suitable conduits. This last factor can be particularly challenging, especially when 1 or both ITAs have been previously harvested. A shortage of arterial conduits at second revascularization may jeopardize long-term outcomes [3].

At the time of redo CABG, recycling a graft is useful in patients with functioning ITA grafts who no longer have suitable arterial graft conduits. Noyez and colleagues [4] were the first to report the technical feasibility of reusing the LITA in redo CABG. A few reports have described satisfactory results after recycling ITA grafts in redo coronary surgery [5, 6]. In terms of reusing an old graft to create a new graft, our case is similar to the previous reports; however, it is unique in that we upgraded an existing single ITA graft to a BITA graft and the time interval between first operation and reoperation was very long (17 years) compared with that reported in previous studies.

Although several options in terms of complete revascularization could have been considered, CABG was preferred in our patient rather than stenting because of the multi vessel disease. When redo CABG is performed, cardiothoracic surgeons need to provide a promising revascularization and carefully select the graft material and design in order to gain the full advantage of CABG. We decided to reuse the patient’s existing LITA graft for the left circumflex artery in redo CABG for the following reasons: In spite of 75% stenosis at the anastomotic site, the residual LITA graft was patent, well developed, and without any significant disease, and the length of this graft was deemed sufficient for reimplantation; further, reusing this used LITA graft enabled us to perform complete revascularization using bilateral ITA in situ grafts for multivessel redo CABG. In a recent study, Hwang and colleagues [7] reported that the composite graft yields comparable results in CABG using an in situ graft. In fact, a composite graft of the free RITA enabled us to perform BITA grafting. However, it would have been necessary to place a stent or a vein patch in the old LITA. We did not think that using a 17-year-old LITA for the inflow of the composite graft would be robust and suitable for our patient. Moreover, we thought that a fresh ITA, which was the RITA in our patient, was more suitable for grafting to the LAD than the old LITA.

Bilateral ITAs are superior to all other graft types for revascularization of the left coronary system in terms of patency, freedom from arteriosclerosis, and survival benefit [1]. We believe that these advantages leading to improved outcomes will promote upgradation of revascularization by recycling patent ITA grafts in patients undergoing redo CABG.

Recycling ITA grafts is not only an optimal solution for the lack of suitable graft conduits often encountered in
patients undergoing redo CABG, but it also enables upgrading from previous single ITA grafting to BITA grafting. Considering its survival benefit, BITA grafting by recycling an existing ITA graft can be a useful surgical strategy for achieving optimal revascularization and good long-term outcome in redo CABG patients.

References

Endovascular Exclusion of Aortoesophageal Fistula After Coarctation Extraanatomical Bypass

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Extraanatomical bypass has been advocated as the primary technique in adolescents or adults presenting with aortic coarctation. This approach carries significant morbidity, and graft-related complications may be more important in the young patient population. A 52-year-old man who had previously undergone extraanatomical bypass of aortic coarctation was diagnosed with a distal anastomotic pseudoaneurysm and aortoesophageal fistula. This was managed by proximal bypass plugging with an occluder, endovascular exclusion with a stent-graft in the thoracic descending aorta covering the pseudoaneurysm, and coarctation balloon dilation.

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Aortoesophageal fistula is a late complication observed after extraanatomical bypass for coarctation. This case illustrates this rare complication.

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Aortic coarctation repair may sometimes be delayed until adolescence or adulthood, either for residual obstruction or late diagnosis. In these patients, extraanatomical bypass has been shown to have low morbidity and mortality [1, 2] and is being increasingly used in this older population [3]. Aortoesophageal fistula remains a highly lethal late complication of extraanatomical coarctation bypass. We report the endovascular management of a late aortoesophageal fistula after extraanatomical coarctation bypass.

A 52-year-old man was admitted urgently for syncope during a skiing vacation; hematemesis occurred later. His previous medical history was notable for recent antibiotic treatment for Helicobacter pylori colonization, as well as aortic coarctation repair in infancy at another institution, which subsequently required transcatheter balloon dilation and stenting, later followed by an extraanatomical bypass between the ascending aorta and distal thoracic descending aorta. Emergency upper endoscopy showed normal esophageal and gastric mucosa, with a small angiodysplasia of the proximal duodenum, which was clipped, and large clots along the entire upper gastrointestinal tract.

A thoracoabdominal computed tomographic scan showed a 37 × 64 mm pseudoaneurysm of the distal extraanatomical bypass anastomosis compressing the esophagus (Fig 1). No active passage of contrast medium from the aorta to the esophagus was visible. Given the persistent hematemesis, the diagnosis of distal anastomosis pseudoaneurysm with aortoesophageal fistula was retained.

The patient was urgently brought to the operating room for fistula exclusion. Because the operative field was considered septic in the setting of an esophageal fistula, a minimally invasive endovascular approach excluding the fistula was preferred at this stage, followed by suppressive antibiotic therapy and later full surgical repair. The proximal extraanatomical bypass was excluded by placing a Medtronic Talent 18-mm occluder (Medtronic, Tolochenaz, Switzerland) through a left axillary access. A Medtronic Valiant stent-graft was placed in the descending thoracic aorta, covering the distal anastomosis of the extraanatomical bypass through femoral access. The previous stent in the coarctation underwent balloon dilation (Cordis POWERFLEX 1.2 × 4 cm, then Cordis MAXI LD 1.4 × 4 cm; Cordis Corp, Bridgewater, NJ). The residual aortic arch peak-to-peak gradient was measured at 20 mm Hg. The patient was started on triple antibiotic treatment (ceftriaxone, metronidazole, and gentamycin). Blood taken before the operation later grew Streptococcus salivarius; all postoperative culture results were negative.

His postoperative course was uncomplicated. He remained hemodynamically stable and maintained good