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How to avoid traction to a pedicled internal thoracic artery graft

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The left internal thoracic artery (LITA) is the most important conduit for coronary artery bypass grafting.¹ Its application is an independent predictor of late survival, and therefore the LITA should be used in almost all patients.² However, which harvesting technique has more advantages is still unclear.^{3,4} In our institution we routinely performed pedicled LITA grafting to avoid deprivation of the vasa vasorum, innervation and lymphatic and venous drainage.

We present our experience with a technique, first described in 1997 by Rao and colleagues,⁵ to perform a tension-free LITA graft to the left anterior descending artery (LAD).

Technique

The coronary artery bypass grafting procedure is carried out under standardized conditions concerning surgical management delivery of anesthesia. As usual, we graft the LAD with the pedicled LITA. Before completion of the distal anastomosis, the pericardium is divided with an inversed T-shaped slit to enable a tension-free position of the graft. In case of traction caused by hyperinflated lungs, we additionally create a slit in the apical segment of the upper lobe during arrested ventilation by using an Endo GIA Universal stapler (Autosuture; Tyco Healthcare, Mansfield, Mass) with a double-breasted self-cutting clip suture of 45 or 60 mm in length. The deflated lung is stabilized with 2 atraumatic clamps, allowing a gentle traction toward the surgeon. The stapler is preliminarily stretched between these 2

clamps, and after verifying the correct position, the cut is released. After restarting ventilation and weaning from cardiopulmonary bypass, the pedicled LITA conduit is run through the resulting fissure and disappears inside the slit, lying in a straight line to the LAD without kinking (Figure 1). Between 2000 and 2003, 35 (2.4%) of 1451 patients undergoing isolated coronary artery bypass surgery were treated with the above technique. Eighty percent (n = 28) of these patients had a history of severe chronic obstructive pulmonary disease with emphysema. All patients had an uneventful intraoperative and postoperative course. No history of persistent pulmonary

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Figure 1. After restarting ventilation, the pedicled LITA is running in a straight line through the fissure of the slit upper lung lobe.

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leakage or prolonged respiratory support was observed nor did major bleeding, mediastinitis or empyema occur.

Discussion

The slitting of the left upper pulmonary lobe is an easy and effective method to avoid traction to the LITA conduit and is also applicable in off-pump surgery. To arrest the ventilation during the procedure is a very useful trick, first to simplify the positioning and second to avoid injury of the inflated lung with the tip of the stapler. This technique is also applicable on the right side, but until now, we have no experience as to how much graft length we could gain with a slit right lung. The main advantage of this technique is the straight, tension-free positioning of the graft without kinking. Furthermore, in case of a redo procedure, the LITA graft is protected underneath the lung and is far away from the track of the sternotomy. However, a disadvantage is represented by the costs in connection with the single-used disposable device. The costs for the device and the clip suture amount to approximately \$250 US. A possible pitfall

might be in patients with multiple apical bullae. A single slit could result in persisting air leaks caused by the possibility of torn tissue. If the patient fulfills the criteria of lung volume reduction surgery, a more extended procedure with resection of the upper segments or a bullectomy could be performed.

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Closure of ventricular septal defects in the donor heart before transplantation: Toward expanded acceptance criteria

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The limited supply and increasing shortage of adequate donor organs for transplantation has been met with expansion of criteria for donor heart acceptance.¹

Patent foramen ovale and atrial septal defects have been diagnosed after cardiac transplantations^{2,3} and have been treated by surgical or transcatheter closure.⁴ Occasionally, significant right-to-left shunting across a septal patent foramen ovale might result in profound hypoxemia. Residual atrial defects might cause a serious hemodynamic compromise because of shunting and significant tricuspid regurgitation.³ The present report describes 2 successful

heart transplantations after concomitant surgical closure of a ventricular septal defect (VSD) in the donor heart.

Dr Perrault

Clinical Summary

PATIENT 1. A 41-year-old man with no medical history was given a diagnosis of brain death after self-inflicted head trauma, and consent was obtained for multiple organ donation.

The preharvesting transthoracic echocardiogram revealed a small, 4-mm, restrictive perimembranous VSD with a normal ejection fraction and normal heart valves. Hemodynamic parameters were completely normal without need for pharmacologic support.

A compatible 58-year-old male recipient with terminal idiopathic dilated cardiomyopathy was identified at our institution.

The donor heart was explanted through a median sternotomy, and cardiac arrest was induced with 1 L of Celsior solution (Sangstat, Montreal, Quebec, Canada) at 4°C along with surface cooling. Before transplantation, the VSD was repaired on the back table through a 4-cm right anterior ventriculotomy. Two interrupted polypropylene 4-0 sutures were used for closure of the defect (Figure 1, A). A standard orthotopic heart transplantation with biatrial anastomotic implantation (Stanford technique) was then performed with an ischemic time of 106 minutes. The pa-

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