Facilitated anastomosis for reoperative circumflex coronary revascularization on the beating heart through a left thoracotomy

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Selective coronary artery bypass of the circumflex system by a limited left thoracotomy on a beating heart has recently been described as an option, especially in patients undergoing reoperation.^{1,2} We³ recently presented our experience in 32 patients with revascularization of the circumflex system performed by a limited left thoracotomy on a beating heart without mortality and with minimal morbidity. Placement of the proximal anastomosis of a saphenous vein graft on the descending aorta can be problematic because of the difficulties posed by suturing at a suboptimal angle deep within the chest on a frequently diseased descending aorta. Indeed, the sutured proximal anastomosis can be the most technically challenging portion of the procedure.

We report our recent favorable experience with an anastomotic connector (Symmetry Bypass System, St Jude Medical, Inc, Maple Grove, Minn) used to facilitate performance of the proximal anastomosis.

Technique

After the patient is positioned, a limited left lateral thoracotomy is made in the sixth intercostal space. With selective ventilation, the left lung is collapsed and the inferior pulmonary ligament is divided to the level of the inferior pulmonary vein. The pericardium is then opened posterior to the phrenic nerve to locate the target coronary artery. In the patient who has had a previous operation, this portion of the heart is usually free of adhesions, and a previously placed saphenous vein graft may serve as a guide in locating the target coronary artery. Attention is then turned to the descending aorta. Transesophageal echocardiography combined with digital palpation is used to locate a disease-free area of the descending aorta. A relatively small island of aortic wall is required to accept the aortic connector compared with the aorta exposed for a partial crossclamp. A previously harvested short segment of saphenous vein is then brought to the operative field.

Use of this proximal anastomotic device necessitates construction of the proximal anastomosis first. To allow placement of the graft without kinking, we choose a site on the anterolateral portion of the aorta. The saphenous vein graft is loaded into the delivery device. With the use of the aortic punch supplied with the device, an aortotomy is made at the predetermined location. A long Kittner instrument instead of a fingertip is used to control bleeding while the loaded saphenous vein graft is brought into the aortotomy and the device deployed. On ascertainment of a secure anastomosis, the distal portion of the vein graft is anastomosed to the obtuse marginal branch of the circumflex artery with stabilization in the usual manner. Care is taken to ensure an appropriate length of saphenous vein graft to avoid redundancy and kinking (Figures 1 and 2). The lung is reinflated with the graft medial to the lung and inferior to the inferior pulmonary vein.

We now have experience in 5 patients undergoing reoperations, aged 81, 56, 68, 82, and 79 years, all with significant disease in the descending aorta. Four patients had a single saphenous vein graft placed to an obtuse marginal branch and 1 patient had 2 separate bypasses performed to the circumflex system with both proximal anastomoses performed with the connector. All 5 operations were completed without consequence, and an estimated 20 to 30 minutes was saved because of the facilitated anastomosis. No additional significant technical challenges were encountered by performance of the proximal anastomosis first.

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Received for publication Oct 29, 2001; accepted for publication Nov 1, 2001.

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J Thorac Cardiovasc Surg 2002;123:816-7

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0022-5223/2002 \$35.00+0 12/54/122528

doi:10.1067/mtc.2002.122528

Figure 1. Schematic representation of a circumflex coronary artery bypass using an anastomotic connector for the proximal anastomosis.

Comment

Despite our significant experience with descending aorta–circumflex artery bypass via a lateral thoracotomy, performance of the hand-sewn proximal anastomosis has been problematic. We have found that use of the facilitated anastomotic connector has significantly eased the technical challenges associated with performance of this portion of the procedure, further adding to the attractiveness of this approach in selected patients.

Figure 2. Operative photograph of a saphenous vein bypass graft. Arrow indicates proximal anastomosis with an anastomotic connector.

References

1. Baumgartner FJ, Gheissari A, Panagiotides GP, Capouya ER, Decusin RJ, Yokoyama T. Off-pump obtuse marginal grafting with local stabilization: thoracotomy approach in reoperations. *Ann Thorac Surg.* 1999;68:946-8.
2. Ricci M, Karamanoukian HL, D'Ancona G, Salerno TA, Bergsland J. Reoperative "off pump" circumflex revascularization via left thoracotomy: how to prevent graft kinking. *Ann Thorac Surg.* 2000;70:309-10.
3. Dewey TM, Magee MJ, Edgerton JR, Vela R, Prince SL, Acuff TE, et al. Left mini-thoracotomy for beating heart bypass grafting: a safe alternative to high-risk intervention for selected grafting of the circumflex artery distribution. *Circulation.* 2001;104(Suppl):I-99-101.