Use of a proximal anastomotic device in coronary artery bypass surgery: A word of caution

G. Phillip Schoettle, Jr, MD, Memphis, Tenn

Patients undergoing coronary artery bypass graft surgery (CABG) today are older and have increased comorbidities than those a decade ago.¹ In an effort to maintain favorable morbidity and mortality data, many cardiac surgeons have begun to perform CABG with less invasive techniques. Avoiding cardiopulmonary bypass and minimizing aortic manipulation with sutureless aortic connectors are two ways to potentially achieve this goal.^{2,3} A review of patients with the Symmetry aortic connector (St Jude Medical, Inc, Minneapolis, Minn), however, has shown a high percentage of early graft occlusions.

Clinical Summary

I report a retrospective review of two patient groups undergoing CABG. In group A, 323 patients underwent surgery from October 2000 through September 2001. In group B, 305 patients underwent surgery from October 2001 through September 2002. All operations were performed by the same surgeon, and 95% of all procedures in both groups were done without cardiopulmonary bypass.

Group A patients had the proximal vein-aorta anastomoses done in the usual fashion with a partial occlusion clamp on the aorta and hand-sewn grafts. The patients in group B received saphenous vein-aorta connections with the St Jude Symmetry device with no aortic clamping. All patients had operative graft patency confirmed with the use of the Medistem transit time flow probe (Medtronic, Inc, Minneapolis, Minn). Patients in both groups received continuous postoperative aspirin and received clopidogrel daily for 2 months.

After institutional review board approval was obtained, a catheterization laboratory database was used to determine which patients had undergone repeat cardiac catheterization after the CABG procedure. End points of reoperative CABG and death were reported as observed. The decision to perform repeat cardiac catheterization was made by each patient's cardiologist and most commonly was based on a clinical suspicion of recurrent ischemia.

To date, 40 patients in group A have undergone repeated cardiac catheterization, and of 71 venous grafts studied, 61 were widely patent. Forty-five patients in group B have undergone repeated cardiac catheterization, and of 88 venous grafts studied, 39 were totally occluded. Seventeen had 90% or greater stenosis, and 15 had 50% or greater stenosis (Table 1). These stenoses uniformly occurred at the connector site. Among the patients studied, this represented an 80% rate of occlusion or stenosis with the proximal venous graft connectors.

Five patients in group B have required early reoperative CABG, and 30 patients have required percutaneous transluminal coronary angioplasty (PTCA) and stenting to relieve the consequences of venous graft occlusion or stenosis. No patients in group A have required reoperative CABG, and only 6 have had PTCA and stenting, primarily for ungrafted or ungraftable vessels. Four patients in group B have had sudden death, all remote from the original bypass procedure. One patient had documented acute myocardial infarction 6 months after CABG during salvage femoral-popliteal grafting and was unable to be resuscitated. No patient in group A is known to have had postoperative sudden death.

Discussion

During the past decade many cardiac surgeons have adopted new technology in attempts to make CABG less invasive. The Symmetry aortic connector is primarily used to minimize trauma to the aorta from clamping. Potential benefits include a decreased incidence of stroke from aortic embolization and prevention of aortic dissection from the partial occlusion clamp. Other possible benefits are a technically superior proximal anastomosis and rapidity of use with decreased operative time.

After Food and Drug Administration approval in 1998 and training by St Jude Medical in its use (September 2001) I exclusively incorporated the proximal anastomotic device into my CABG practice. After 12 months, it was apparent that the incidence of saphenous vein occlusion or stenosis associated with the proximal connector was not compatible with my previous off-pump CABG experience. The large number of aortic venous graft connector stenoses or occlusions seen in group B have required multiple interventions—either PTCA and stenting, reoperative CABG, or aggressive medical therapy in patients not amenable to repeated intervention. The patients in group A, although subjected to a longer period of observation, have not had an unexpected number of venous graft occlusions, nor have they required the large number of interventions needed by those in group B.

The 4 sudden deaths among the patients with connector use and the documented venous graft occlusions or stenoses leading to early reoperative CABG are cause for concern. I also note that the patients who require PTCA and stents to relieve proximal connector venous graft stenosis are likely subject to the restenosis rate inherent in stented vessels.

From the Department of Thoracic and Cardiovascular Surgery, University of Tennessee, Methodist University Hospital, Memphis, Tenn.

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Address for reprints: G. Phillip Schoettle, Jr, MD, Clinical Associate Professor of Surgery, Department of Thoracic and Cardiovascular Surgery, Methodist University Hospital, 1325 Eastmoreland, Suite 220, Memphis, TN 38104.

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TABLE 1. Comparison of results between patients with (group B) and without (group A) connectors

	Group A (n = 323)	Group B (n = 305)	P value
Patients undergoing repeated cardiac catheterization	40	45	NS
Venous grafts studied	71	88	NS
Venous grafts patent	61	18	<.0001
Venous grafts occluded	10	39	<.0001
Venous grafts with >50% stenosis	0	31	<.0001

NS, Not significant.

The proximal connector device is appealing for the reasons mentioned previously. For facilitated anastomoses to justify the expense and replace traditional hand-sewn grafts, however, they

must have equal or better short- and long-term patencies. Despite potential benefits of sutureless aortic connections, this patient review demonstrates unacceptable saphenous venous graft stenosis and occlusion with the use of the Symmetry aortic connector.

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Apicoaortic conduit in a patient with severe hemolysis after three aortic valve replacements

Christian A. Skrabal, MD,^a Matthias Loebe, MD, PhD,^a Larry O. Thompson, MD,^a John M. Buegler, MD,^b Keith A. Youker, PhD,^a Javier A. Lafuente, MD,^a and George P. Noon, MD,^a Houston, Tex

Left ventricular outflow obstruction usually requires repair or replacement of the aortic valve or resection of a subannular stenosis. Cooley and Norman¹ proposed the implantation of a valve-containing conduit between the apex of the left ventricle and the descending thoracic aorta for treatment of complex outflow obstruction. Following a 5-year follow-up, we report the case of a patient who underwent apicoaortic conduit implantation in 1997.

Clinical Summary

The patient had a history of 3 previous aortic valve replacements including replacement of the ascending aorta for repair of prosthetic endocarditis with annular abscess. The need for the implantation of an apicoaortic conduit arose from an enduring hemolysis secondary to a relatively undersized aortic valve prosthesis. In 1975, the then 36-year-old man underwent replacement of a bicuspid stenotic aortic valve with a Björk-Shiley convexo-concave (BSCC) mechanical heart valve (Shiley, Inc, Irvine, Calif, a subsidiary of Pfizer, Inc). In September 1995, the patient had a high fever, chills, fatigue, joint pain, and painful peripheral subcutaneous nodes of the phalanges. Echocardiography revealed a paravalvular leak with fistula to the right ventricle. Blood cultures were positive for *Staphylococcus aureus*. After prolonged intravenous antibiotic therapy, replacement of the Björk-Shiley valve and repair of the aorta-right ventricular fistula was performed by implantation of a 21-mm St Jude Medical valve (St Jude Medical, St Paul, Minn) with aortic root replacement using a Hemashield graft (Meadox Medicals, Inc, Oakland, NJ). The coronary arteries were reinserted by the Cabrol technique. In October 1996, however, the patient had increasing fatigue, and echocardiography showed severe subvalvular aortic stenosis. The aortic valve area was 0.6 cm² with a mean pressure gradient of 56 mm Hg and a peak velocity of the stenotic jet of 4.85 m/s. An attempt was made to excise the stenosis through the valve but the valve broke under the stress. After resection of the valve and subvalvular stenosis, a 19-mm St Jude Medical prosthesis was implanted. Subsequently, the patient began to experience hemolysis with consecutive anemia

From the Michael E. DeBakey Department of Surgery, Division of Transplant and Assist Devices,^a and Department of Medicine, Section of Cardiology,^b Baylor College of Medicine, Houston, Tex.

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Address for reprints: Matthias Loebe, MD, PhD, Baylor College of Medicine, Michael E. DeBakey Department of Surgery, Division of Transplant Surgery and Assist Devices, 6560 Fannin Street, Scurlock Tower, Suite 1860, Houston, TX 77030 (E-mail: mloebe@bcm.tmc.edu).

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