

# Reoperative myocardial revascularization

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The swift evolution of myocardial revascularization in the past decade has concealed the precise estimate of reoperative grafting. The number of patients selected for reoperation has risen steadily since 1971 and accounted for 4.0% of bypass procedures performed at the Cleveland Clinic in 1976. Today revascularization is more complete and, consequently, technically more complex; yet the risk of the primary operation is low and graft patency rates are consistently high, at least for the first few post-operative years. The major reoperative indications are (1) progressive atherosclerosis in ungrafted vessels, (2) graft failure, (3) combinations thereof, and (4) previous Vineberg procedure or incomplete revascularization. The foremost consideration is technically favorable vessel size and arterial runoff as indicated by arteriograms. Occlusion of a vein autograft constructed to an anatomically small or diffusely atherosclerotic coronary vessel is not necessarily the reason for reoperation. The decision is based on the patient's level of physical discomfort, the number and quality of coronary vessels involved, and the presence or absence of additional and irreversible ventricular damage. When use of the mammary artery is contem-

plated, the angiographer can inject one or both internal mammary arteries during catheterization to confirm their viability.

Attention to technical detail is crucial in the reoperative revascularization. For safety, a femoral artery can be exposed before reentry. An oscillating saw is usually favored and the sternal tables must be mobilized bilaterally by sharp dissection before insertion of the retractor. Only the right heart structures are mobilized before cannulation. Through 1975 we used normothermic perfusion, but more recently hypothermia and multiple dose cardioplegic solutions have been employed with increasing frequency. The relaxed heart can be freed of adhesions more easily and myocardial preservation is facilitated, especially during long procedures. After cannulation, dissection begins along the diaphragmatic surface, extending posteriorly to free the anterior wall from the left side. Sharp dissection is mandatory; blunt dissection causes epicardial tears and promotes further blood loss. Operative mortality was 3.7% in the first 219 consecutive reoperations.<sup>1</sup> In our initial report, the leading complications were hepatitis (11%), bleeding (10%), and myocardial infarction (9%). In the past 18 months, blood transfusion has been reduced more than 35% by a combination of the following measures: (1) autotransfusion, (2) greater hemodilution, and (3) membrane oxygenator perfusion.

After an average follow-up of 2½ years, 93% of patients (202/219) were alive and 65% were asymptomatic. Improvement in symptomatic status postoperatively was similar, regard-

less of indication for reoperation; i.e., those operated on for graft failure alone had results similar to those operated on for progressive atherosclerosis or combined indications. Overall graft patency was 84% and secondary grafts constructed to arteries involved with primary graft failure achieved a similar high graft patency. Clinical experience with the internal mammary artery graft in these cases<sup>2</sup> shows that this conduit has become a valuable alternative for patients who have small coronary vessels or previous anterior descending vein graft failure.

All too often, patients who become symptomatic in later years after successful myocardial revascularization are not thoroughly studied. Patients who suffer early graft failure or experience progressive atherosclerosis should not be relegated to medical treatment until they are fully evaluated by arteriography to determine the true status of the previous operation and the fate of the grafted and ungrafted vessels. Good results can be attained through competent selection of the reoperative candidate and attention to operative detail. Excellent clinical and angiographic results can be obtained, whether the patient has been operated on for progressive atherosclerosis, graft failure, or previous incomplete revascularization.

## References

1. Irrarrazaval MJ, Cosgrove DM, Loop FD, et al: Reoperations for myocardial revascularization. *J Thorac Cardiovasc Surg* **73**: 181-188, 1977.
2. Loop FD, Carabajal NR, Taylor PC, et al: Internal mammary artery bypass graft in reoperative myocardial revascularization. *Am J Cardiol* **37**: 890-895, 1976.