Editorial:
The Role of Bypass Surgery in Isolated Left Anterior Descending Artery Stenosis or Occlusion

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IN THIS ISSUE of Circulation, Lytle and co-workers describe the results of aortocoronary bypass surgery after a mean follow-up of 5½ years in two consecutive series of 100 patients with isolated left anterior descending stenosis or occlusion. One group received saphenous vein grafts and the other left internal mammary artery grafts. Postoperative coronary angiography was carried out after a mean interval of 20 months in 102 patients, 56 with saphenous vein grafts and 46 with internal mammary artery grafts. Their study demonstrates that the overall late patency rate is slightly higher for internal mammary artery grafts to the left anterior descending artery than for saphenous vein grafts to the same vessel (91% vs 79%, respectively). However, when the slight difference in follow-up between the two groups is eliminated by actuarial methods, there is no statistically significant difference in the functional class of angina and in the rate of infarction, death and reoperation. These observations are of great practical interest because each bypass conduit has technical advantages and disadvantages and each appears to be better suited to different anatomic and pathologic situations of the left anterior descending artery.

Lytle and co-workers also raise the issue of the indications of aortocoronary bypass surgery in patients with isolated left anterior descending disease. This problem is still controversial, and although the authors' results demonstrate what superb surgical management can accomplish, the usually good symptomatic relief afforded by current medical therapy, the favorable 5-year prognosis of this condition and the unpredictable but significant and time-related progression of disease in the other coronary arteries must be weighed in the balance.

The current risk of bypass surgery is small but should not be ignored. Immediate risks include the operative mortality, perioperative myocardial infarction and early graft occlusion. When analyzing them, one must consider not only the excellent results reported by groups such as the Cleveland Clinic but also the average results of other centers. There were no operative deaths among the 200 patients studied by Lytle and co-workers. In most centers, however, the operative mortality of patients with good left ventricular function is approximately 1%. Three patients in the Lytle study experienced perioperative myocardial infarctions, an incidence of 1.5%. However, the diagnosis of this complication was based on the occurrence of new Q waves on the ECG, which underestimates its true incidence, while serum levels of creatine kinase (CK-MB) isoenzymes overestimate it. The average incidence of perioperative myocardial necrosis is 5-10%. It is not related to the number of arteries involved but increases with the number of bypass grafts and the duration of cardiopulmonary bypass. In the Lytle study, 14% of the grafts were occluded within an average of 20 months. In general, 15-20% of grafts become occluded during the first year after surgery, especially within the first 3 months. After the first year, the occlusion rate of grafts is roughly 2% per year during the next 5 years.

Aortocoronary bypass surgery is highly effective for the relief of angina pectoris. However, medical management has also improved in the last decade and, with adequate doses of nitrates and β-blocking agents, angina can now be controlled in most patients with moderate coronary artery disease.

Moreover, the natural progression of coronary atherosclerosis continues in the nongrafted coronary arteries and the palliative role of bypass surgery is now well recognized. Each year 5-10% of patients have recurring symptoms and reduced exercise tolerance and after 5 years only one patient in two remains asymptomatic. However, a more favorable course should be expected in patients with isolated left anterior descending disease with normal and minimally diseased other coronary vessels.

A high-grade proximal stenosis of the left anterior descending artery is always impressive and evokes the fear of catastrophe, i.e., sudden death or acute myocardial infarction, either fatal or with residual damage if surgery is postponed and the lesion is allowed to progress to subocclusion or occlusion. However, no evidence indicates that bypass surgery prevents acute myocardial infarction in any subgroup of patients with coronary artery disease. The intervention itself carries a known risk of perioperative myocardial infarction and late myocardial infarctions.
have a yearly incidence of 3–4%,10 roughly similar to that observed with medical therapy. In the report of Lytle and co-workers, late postoperative myocardial infarction was seen in only four patients during a 5-year period. However, follow-up ECGs were not available routinely and this low incidence may in part represent an underestimation.

One of the major advances in our knowledge of coronary artery disease in recent years has been the recognition that its prognosis depends essentially on the severity of the coronary lesions and on the status of left ventricular function.1–3

Recently, it has been clearly demonstrated that, at least for some patients, bypass surgery prolongs survival and reduces the incidence of acute coronary events. This applies particularly to patients with left main coronary artery disease.11 The data also suggest that it may apply to patients with severe disease of all three coronary arteries.12, 13 For patients with two- and one-vessel disease, recommendation of surgical bypass in order to prolong survival is not justified from the currently available studies. Since the 5-year survival of patients with one-vessel disease is equally high (94–98%) for patients treated with either the medical or surgical approach,12 it is doubtful that studies in progress will demonstrate the superiority of one form of therapy over the other in the majority of patients with isolated left anterior descending disease.

However, the classification of patients into subgroups with one-, two- and three-vessel disease is somewhat artificial and does not take into consideration the area of heart muscle perfused by individual coronary arteries. Whether patients with critical isolated left anterior descending stenoses (greater than 70% reduction of luminal diameter) and large areas of viable myocardium at risk will experience a reduced rate of complications and deaths after bypass surgery is not known. The results of studies in progress, such as the Coronary Artery Surgery Study sponsored by the National Heart, Lung and Blood Institute, will eventually provide information. For now, bypass surgery should continue to be recommended without delay to patients with critical left anterior descending stenoses or obstructions who have limiting symptoms despite adequate medical therapy.

Finally, will percutaneous coronary angioplasty be of long-term benefit to some patients with high-grade isolated left anterior descending artery stenosis? Presently, such patients are believed to be ideal candidates for this procedure.14 Percutaneous coronary angioplasty is a promising technique, which has approximately a 65% primary success rate and a 55% success rate after 3 months when applied to the left anterior descending artery. Because of its relatively high risk of failure or complications, percutaneous coronary angioplasty should only be attempted in patients who are potential candidates for aorto-coronary bypass surgery as described above and as an investigational procedure in centers with a vast experience in the management of coronary artery disease.

References
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