HEART OF THE MATTER

Coronary Revascularization In Ischemic Heart Disease

Coronary revascularization using bypass grafting with arterial or venous conduits has been with us since 1968 when Dr. Rene Favaloro performed the first saphenous venous graft for the treatment of angina pectoris (J. Thorac. Cardiovasc. Surg. 1969;58:178-85). Although it is clear that coronary artery bypass grafting (CABG) has been effective in decreasing symptomatic angina, with few exceptions there has been little to support its benefit in prolonging life. One of those exceptions was identified in a subgroup of the initial Coronary Artery Surgery Study carried out in the 1980s and sponsored by the National Heart, Lung, and Blood Institute (N. Engl. J. Med. 1985;312:1665-71). Of the 780 patients with chronic stable angina randomized to medicine only or CABG, there was a significant decrease in both angina and mortality in a subgroup of 160 patients with ejection fractions below 50%, primarily in patients with triple-vessel disease.

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Since that report in 1985, there have been no clinical mortality trials examining the clinical benefit of CABG surgery in patients with ischemic heart failure. A randomized trial to evaluate the benefit of surgical ventricular reconstruction plus CABG, compared with CABG alone, failed to observe any benefit (N. Engl. J. Med. 2009:360;1705-17).

The suggestion that CABG could improve ventricular function is based on the observations by Dr. Shahbudin Rahimtoola in the 1980s in studies showing improved function in patients before and after CABG (Am. Heart J. 1989;117:211-21). He proposed the concept that areas of "hibernating myocardium" exist in the ischemic ventricle that can be revived by restoring its blood supply by CABG. But to a large degree, patients with ischemic heart failure have not been a prime target for CABG, and attempts to show clinical benefit in symptomatic improvement in heart failure has not been explored.

The recent report of the Surgical Treatment for Ischemic Heart Failure (STICH) trial has provided important information supporting the mortality and morbidity benefit of revascularization in patients with symptomatic ischemic heart failure (N. Engl. J. Med. 2011;364:1607-16). This study, also supported by NHLBI, was carried out in 26 countries throughout the world. In the 1,212 patients randomized to standard medical therapy alone, compared with medical therapy plus CABG, there was no significant benefit observed in the CABG patients in all-cause mortality, but there was a 19% decrease in cardiovascular mortality ($P = .05$) over a 3-year mean follow-up, and a 26% decrease in all-cause mortality and cardiovascular hospitalization (P less than .001). When patients who received CABG either by random assignment or because they were crossed over to surgery (620) were compared with those patients who remained on medical therapy (592), the effects of surgery were even more impressive, with a 30% decrease in all-cause mortality (P less than .001). The patients included in STICH were severely symptomatic, almost all with significant angina and 37% in NYHA HF class III/IV with a mean ejection fraction of 27%. Surgery carried an early upfront mortality risk of approximately 4%, which took about 2 years to overcome.

One interesting additional aspect of STICH was the viability study carried out in a subset of 601 patients using either dobutamine echocardiograms or SPECT stress testing. Although patients who demonstrated viability had a better outcome, viability did not define those patients who would benefit by CABG (N. Engl. J. Med. 2011;364:1617-25).

The "backstory" of the STICH trial was the failure of the U.S. cardiothoracic surgery centers to participate in it in a significant way. A total of 26 countries were required to achieve the 2,136 patients enrolled in the total STICH trial, and only 307 patients (14%) were American. The failure of the academic and large clinical centers to grasp the importance of this trial, and their reluctance to participate, was unfortunate.

The results of STICH indicate that the addition of CABG to patients already receiving optimal medical therapy provides a significant mortality and morbidity benefit. Unfortunately, viability studies do not provide helpful information in regard to the optimal selection of patients for CABG in ischemic heart failure. That decision appears to depend upon the availability of acceptable target vessels. But the data do support CABG, performed with an acceptable risk in experienced hands, as providing long-term benefits for heart failure patients.

Revascularization provides an additional mode of therapy for the treatment of patients with symptomatic ischemic heart failure, which could become a potential therapeutic target for percutaneous intervention in patients with the appropriate anatomy. ■

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