# Bypass Grafting Trumps PCI for Coronary Disease

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CHICAGO — Bypass grafting is superior to percutaneous intervention for the treatment of severe coronary artery disease, according to a large retrospective study presented at the annual meeting of the Society of Thoracic Surgeons.

The study, prompted in part by what the authors called "limitations in the ability of randomized trials to represent typical [coronary artery disease] patients seen in clinical practice," also found that:

► The treatment of coronary artery disease (CAD) has improved over time as measured by mortality outcome.

► Both coronary artery bypass grafting (CABG) and percutaneous intervention (PCI) are superior to medical therapy for all degrees of CAD.

► Contrary to conventional wisdom, the advantage of CABG over PCI increased in the bare stent era.

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The observational data analysis of 18,481 patients with significant coronary disease (greater than 75% stenosis of at least one coronary artery) was carried out between 1986 and 2000 with subsequent follow-up at Duke University Medical Center in Durham, N.C., and the Miriam Hospital Cardiac Center in Providence, R.I. Patients with significant left main obstruction and significant mitral regurgitation, as well as those who died following medical treatment within 5 days of index cardiac catheterization (median time to surgery), were excluded from the analysis.

The research team, led by Dr. Peter K. Smith at Duke, targeted all-cause mortality as the primary outcome variable. The goal was to assess the effectiveness of different types of treatment for CAD. The data were further broken down into three "eras" of treatment selection: 1986-1990, 1991-1995, and 1996-2000.

Each group was further stratified based on disease severity: low (predominantly one-vessel disease), intermediate (predominantly two-vessel disease), and high (primarily three-vessel disease).

Patients remained in their initial treatment groups regardless of subsequent crossover to alternate therapy. The Multivariable Cox Proportional Hazard Model was used to adjust for cardiovascular risk factors and to correct for propensity of treatment selection.

In the low- and intermediate-disease groups, CABG and PCI appeared to contribute equally to the survival advantage, but in high-severity disease, CABG conferred a mean survival advantage of about 8 months. When examined by era in terms of absolute survival advantage in months per 7 years' follow-up, the data showed that CABG:

► Conferred an additional survival trend compared with PCI, especially for high-severity disease, in the 1986-1990 era.

► Provided a statistically significant absolute survival advantage over PCI for high-severity disease, with no difference in less severe disease, during the 1991-1995 era.

► Provided an additional 5 months of life per 7 years of follow-up in high-severity disease during the 1996-2000 era, which was characterized by the general availability of bare metal stents.

"Compared to the bypass and medical therapy groups, the PCI group had a higher ejection fraction and a higher likelihood of prior myocardial infarction but a lower incidence of congestive heart failure, diabetes, cerebral vascular disease, peripheral vascular disease, and chronic renal disease. Medical therapy and CABG patients shared similar risk factors," Dr. Smith said.

"PCI patients were more likely to have one- or two-vessel disease, and bypass grafting most often was performed for two- or three-vessel disease," he added.

The inherent risk of cardiovascular death increased throughout the study period for all patients, though PCI patients had a generally lower risk over time than did the other two cohorts.

"Thus, revascularization with either PCI or bypass grafting provided improved survival, although the overall survival at

17 years' follow-up was less than 45%," Dr. Smith explained. The survival advantage provided by revascularization varied significantly with disease severity; less than 30% of high-severity disease patients survived to 17 years, regardless of initial therapy.

During the discussion period, physicians praised Dr. Smith and his team for clarifying an issue that goes to the heart of clinical practice. "For the last 30 years we have been engaged in a series of dialogues with our cardiology colleagues, other physician groups, patients, the press, and the government on the relative merits of the percutaneous treatment of coronary disease relative to bypass surgery," said Dr. Bruce W. Lytle of the Cleveland Clinic Foundation. Physicians have seized upon randomized, prospective trials which have shown little or no difference in survival between PCI and surgery, he said. Because those trials were biased at the point of patient inclusion, they tend to be made up of relatively low-risk patient subsets that tend to inflate PCI survival rates, he added.

"I believe there is compelling evidence now that coronary bypass is superior to percutaneous intervention for patients with multivessel disease," said Dr. Robert A. Guyton of the Emory Clinic in Atlanta. "The New York State Registry reported in 2000 that in the present era, there was a highly significant survival advantage for coronary bypass at 3 years and a 43% relative survival advantage for triple vessel disease, including the proximal left anterior descending. But the [physicians] responded, 'now we have stents,' and they told their patients there was no mortality difference between stenting and coronary bypass. Last year, the data from New York were presented for the stent era, and there still was a highly significant survival advantage—46%—for coronary bypass. [Physicians] responded, 'now we have drug-eluting stents,' " Dr. Guyton said from the floor, adding that coronary occlusion, not restenosis, delivers the fatal blow and CABG protects against coronary occlusion by revascularizing the distal vessels.

"With these new data, can we continue to passively let the interventionalists present their position . . . to multivessel disease patients?" Dr. Guyton asked Dr. Smith. "With the data you presented and the data from New York, is there not now an ethical imperative to confront cardiologists with these data and to educate primary care physicians and our patients?"

Following extended applause, Dr. Smith replied, "The short answer is 'yes.' " ■