Robotically Assisted CABG Appears Cost Effective

BY BRUCE JANCIN
Denver Bureau

NEW YORK — Robotically assisted minimally invasive coronary artery bypass graft surgery proved cost equivalent to conventional off-pump sternotomy CABG in a 200-patient prospective study featuring 1 year of follow-up.

This finding debunks widely repeated claims that robotically assisted minimally invasive CABG (miniCABG), with its steep high-tech equipment costs, is not financially viable, Dr. Robert S. Poston Jr. said at the annual meeting of the American Surgical Association.

In fact, just the opposite proved to be true. In the highest-risk patient subset—those who ranked preoperatively as class 4 DRG (diagnosis-related groups) severity—profit margins were 65% greater with miniCABG than with sternotomy CABG.

Hospital reimbursement for CABG in such patients is about $80,000. With miniCABG that resulted in a profit margin of close to $25,000 per class 4 severity patient, according to Dr. Poston, formerly of the University of Maryland, Baltimore, and now chief of cardiac surgery at Boston Medical Center.

The explanation for the impressive profit margin lies in the fact that rates of postoperative complications such as prolonged ventilator time, increased length of hospital stay, and need for numerous transfusions occur less often with miniCABG—and patients who are DRG class 4 severity are at greatest risk for such complications, he said.

The study population included 100 consecutive patients at the University of Maryland who underwent miniCABG with robotic harvesting of both left and right internal mammary arteries (IMAs) through a small thoracotomy incision in the left chest. In each case, the right IMA graft was placed on the left anterior descending coronary artery and the left IMA was taken to a lateral wall target. This is a hybrid procedure in which coronary stents are utilized elsewhere as needed.

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DR. POSTON

The control group comprised 100 matched patients with an equivalent number of target coronaries and disease severity scores who underwent sternotomy and off-pump CABG using left IMA and saphenous vein grafts.

MiniCABG vs. Sternotomy CABG: Hospital Outcomes

	MiniCABG (n = 100)	Off-Pump Sternotomy CABG (n = 100)
Transfusion volume	0.3 units	1.5 units
Operating room time	5.8 hours	4.1 hours
Intubation time	4.8 hours	12.2 hours
ICU length of stay	21.9 hours	50.6 hours
Hospital length of stay	3.8 days	6.4 days

Source: Dr. Poston

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All 200 subjects were operated on by the same surgeon. The patient population was a relatively sick high-risk group typical of those presenting for CABG at tertiary centers. Most had triple-vessel disease. Diabetes and chronic lung disease were highly prevalent. About 20% of patients had a left ventricular ejection fraction below 35%.

Robotic harvesting of both IMAs through a small incision is tedious work, as reflected in the significantly longer mean operating room time in the miniCABG group. The miniCABG group also had increased expenses for single-use robotic instruments and coronary stents. But these increased costs were counterbalanced by the longer intubation time, more transfusions, and greater hospital length of stay in the sternotomy CABG group (see box).

Moreover, the 1-year rate of major adverse cardiovascular events—death, MI, stroke, or target vessel occlusion—was just 4% in the miniCABG group, compared with 26% in the sternotomy group. This marked difference in key outcomes was driven largely by significantly better target vessel graft patency in the miniCABG group as assessed by CT angiography at 12 months. The saphenous vein grafts had a high failure rate.

Patient satisfaction was markedly better in the miniCABG group. "Perhaps it was a result of the shorter hospital stay, or fewer complications, or the cosmetics of the operation," Dr. Poston surmised. Regardless, 80% of miniCABG patients rated their experience a 6 on a 1-6 scale. Half as many sternotomy CABG patients did so. In addition, return to work came a mean of 2 months earlier in the miniCABG group.

He declared having no financial conflicts of interest with regard to this study. ■

Diabetes Poses Little Adverse Event Risk Soon After CABG

BY MARK S. LESNEY
Senior Editor

Diabetes is not an independent risk factor for adverse early outcomes after coronary artery bypass grafting surgery, according to a large, retrospective study of patients who underwent the procedure over a 10-year period at a single institution.

This result may be due to improvements in management of glucose levels, according to a report by Dr. Pedro E. Antunes and colleagues.

Up to one-quarter of the patients undergoing coronary artery bypass grafting surgery (CABG) have diabetes. Previous reports have been conflicting regarding the negative impact of diabetes on short-term mortality and morbidity in patients undergoing CABG, with older studies finding a clearer relationship between diabetes and worse outcomes, the authors wrote.

In this study, 4,567 patients underwent isolated CABG over a 10-year period at the Hospitais da Universidade, Coimbra, Portugal. Overall, the rate of diabetes mellitus was 22% in these patients, ranging from 19% at the beginning of the study in 1992 to 27% at the end of the study in 2001—a significant decade trend (Eur. J. Cardiothorac. Surg. 2008;34:370-5). The study did not distinguish type 2 from type 1 diabetes.

The diabetic patients showed a significantly worse case-mix, compared with the nondiabetic patients according to the researchers. Diabetic patients had a higher mean age, a higher mean body mass index, and a higher proportion of patients with dyslipidemia, anemia, cardiomegaly, renal failure, peripheral vascular disease, cerebrovascular, and other comorbidities.

Perioperative glucose control in diabetic patients aimed at between 120 and 160 mg/dL. They received a standard sliding scale of subcutaneous insulin injection pre- and postoperatively, and in the operative room and ICU they received continuous intravenous insulin infusions.

The overall in-hospital mortality was 0.96% (44 individuals). There was no significant difference in mortality rate for the diabetic and nondiabetic groups (0.9% and 1.0%, respectively). Multivariate analysis showed that the presence of diabetes was not an independent predictor of in-hospital mortality.

As for in-hospital morbidity events, univariate analysis showed that diabetes was significantly associated only with cerebrovascular accident and prolonged length of stay. However, these associations disappeared in multivariate analysis, and only the development of mediastinitis in the diabetic patients showed significance.

"Better blood glucose management in the perioperative period improves early outcomes in diabetic patients subjected to CABG," the authors reported.

Limitations to the study reported by the authors include that it is observational and retrospective. ■

Obesity Elevated Morbidity, Not Mortality After CABG

BY MITCHEL L. ZOLER
Philadelphia Bureau

TORONTO — Obesity was linked to an increased risk for postsurgical complications in a study of more than 11,000 patients who underwent coronary bypass surgery.

But in this series, obesity did not result in a significantly increased risk for postsurgical mortality, Dr. Mahboob Alam said at the 14th World Congress on Heart Disease.

Obesity also was linked to a significant 38% reduced risk for repeat operations for postoperative bleeding, an unexpected finding that requires further study to understand, said Dr. Alam, a cardiologist at Baylor College of Medicine, Houston.

The retrospective study included 11,417 consecutive patients who underwent coronary artery bypass surgery at St. Luke's Episcopal Hospital in Houston during 1996-2006. The series included 2,257 patients (20%) who were obese, which is defined as having a body mass index of 30 kg/m^2 or greater.

The nonobese patients were older, with an average age of 64 years, compared with an average age of 61 in the obese patients. But the obese patients had more comorbidities, with higher rates of unstable angina, coronary artery disease, hypertension, heart failure, and diabetes.

The primary end point for the analysis was mortality during the first 30 days following bypass surgery, and although the obese patients had an 8% increased risk for death in a multivariate analysis, this difference was not statistically significant relative to the nonobese patients, Dr. Alam said at the congress sponsored by the International Academy of Cardiology.

Obesity was tied to a higher risk of renal insufficiency, MI, and respiratory failure.

DR. ALAM

The multivariate analysis showed that obesity was linked with significant increases in the rate of several new-onset morbidities, compared with nonobese patients following coronary artery bypass, including a 43% increased rate of renal insufficiency, a 71% increased rate of myocardial infarction, a 46% rise in respiratory failure, a 2.9-fold increased rate of sternal wound infections, and a 2.1-fold boost in the rate of leg wound infections. ■