Off-Pump CABG Safer Than On-Pump for STEMI

BY DOUG BRUNK
San Diego Bureau

SAN DIEGO — Patients with ST segment elevation MI who underwent off-pump coronary artery bypass grafting had significantly lower morbidity and mortality compared with patients who underwent on-pump CABG, results from a randomized, single-center Italian study showed.

Between February 2002 and October 2007, 127 patients underwent CABG at the University of Palermo, Italy, within 48 hours from onset of symptoms. Patients were included in the study if they had evolving myocardial ischemia refractory to medical therapy; presence of left main stenosis and/or three-vessel disease; ongoing ischemia despite successful or failed percutaneous coronary intervention (PCI); or complicated PCI; or if they were in cardiogenic shock and had complex coronary anatomy.

Of the 127 patients, 65 were assigned to receive on-pump therapy while 62 received off-pump therapy, Dr. Khalil Fattouch reported at the annual meeting of the American Association for Thoracic Surgery.

The mean age of patients was 62 years and 22% were older than age 70. The only statistically significant preoperative differences between the two groups were related to gender (77% in the on-pump group were men vs. 61% in the off-pump group), and history of a previous myocardial infarction (19% in the on-pump group vs. 39% in the off-pump group), said Dr. Fattouch of the department of cardiac surgery at the university.

The mean number of grafts used per patient was 2.8 in the on-pump group vs. 2.6 in the off-pump group, a difference that was not statistically significant. The mean follow-up was 22 months.

Dr. Fattouch reported that the overall in-hospital mortality was 4.7%. In-hospital mortality was significantly higher for the on-pump group compared with the off-pump group (7.7% vs. 1.6%, respectively). More on-pump group patients in cardiac shock died in the hospital compared with their off-pump counterparts (27% vs. 7.5%) as did on-pump patients who underwent CABG in less than 6 hours from onset of symptoms (23% vs. 7.5%).

Intraoperatively, the use of catecholamines, time of inotrope support, time of intra-aortic balloon pump use, and length of mechanical ventilation were significantly greater in the on-pump group compared with the off-pump group.

Postoperatively, the incidence of low cardiac output syndrome, reoperations for bleeding, and lengths of ICU and hospital stays were significantly greater in the on-pump group compared with the off-pump group.

In addition, the serum levels of troponin I and creatine kinase MB were higher during the first 48 hours after surgery in the on-pump group compared with the off-pump group, said Dr. Fattouch, who disclosed that he had no conflicts of interest. ■

Multiorgan Failure Thwarts Circulatory Support Efforts

BY MITCHEL L. ZOLER
Philadelphia Bureau

BOSTON — Patients with advanced heart failure often receive a mechanical circulatory support device too late, when they have already begun to have multiorgan failure that is irreversibly fatal.

That was one lesson drawn from data collected on 420 patients who received a mechanical circulatory support (MCS) device at any of 75 U.S. centers that participated in a registry during June 2006–December 2007, Dr. William L. Holman said at the annual meeting of the International Society for Heart and Lung Transplantation.

The overall 6-month mortality of the 420 patients reviewed by Dr. Holman was 25%, but the mortality rates were especially high among patients who required biventricular support—an indication that they had right-ventricular as well as left-ventricular failure—and in patients with elevated bilirubin (defined as greater than 1 mg/dL) or ascites. Such elevations in these patients are caused by worsening right-ventricular failure and poor right-ventricular filling, a condition that in turn is caused by prolonged and worsening left-ventricular failure. They are also indicators that multiorgan failure is occurring as a consequence of impaired systemic circulation caused by poor right-ventricular function, said Dr. Holman, a professor of cardiothoracic surgery at the University of Alabama at Birmingham.

Patients often deteriorate to this state by the time they are referred for an MCS device because they have not been followed frequently enough or treated in a timely manner with the full range of medical treatments that have been proved to slow the worsening of heart failure, said Dr. Raymond L. Benza, a cardiologist and director of the pulmonary vascular disease program at the University of Alabama at Birmingham.

Among patients in the INTERMACS registry, the 59 patients with detectable ascites had a 43% mortality rate during the 6 months after receiving an MCS device, compared with a 20% rate in patients without ascites. Among the 218 patients with a bilirubin level greater than 1 mg/dL, the mortality rate was 32%, compared with a 16% rate in patients with a level of 1 mg/dL or less.

A multivariate analysis that controlled for demographic and clinical variables identified these and other factors (cardiogenic shock, placement of a total artificial heart) as significant risk factors for death in the Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS). (See box.)

INTERMACS is supported by the Food and Drug Administration and the Centers for Medicare and Medicaid Services, and allows registration of U.S. patients who receive an FDA-approved MCS device. ■

Risk Factors for Death in Mechanical Circulatory Support Device Recipients

Clinical feature	Relative risk of death compared with patients without feature
Age > 60 years	1.41
Serum bilirubin	
>1 mg/dL	1.49
Presence of cardiogenic shock	1.55
Presence of ascites	2.04
Need for biventricular support	2.12
Need for a total artificial heart	2.41

Notes: Based on a 6-month follow-up of 420 patients. Relative risks were all statistically significant.
Source: Dr. Holman

ELSEVIER GLOBAL MEDICAL NEWS

LVAD Placement Resolved Pulmonary Hypertension in Severe Heart Failure

BY MITCHEL L. ZOLER
Philadelphia Bureau

BOSTON — Patients with severe heart failure and severe secondary pulmonary hypertension who received left ventricular assist devices improved enough to subsequently undergo heart transplant in two separate series.

Pulmonary hypertension has traditionally been considered a contraindication for heart transplant, but the new findings suggest it may instead be an indication for using an LVAD as a bridge to transplant, Dr. Leon P. Jacob said at the annual meeting of the International Society for Heart and Lung Transplantation.

A multicenter, prospective study using LVADs in patients with pulmonary hypertension is needed to better define how the hypertension is resolved, and perhaps "lead to novel, targeted treatments for this disease and may qualify more patients for heart transplantation," said Dr. Jacob, a physician at the Texas Heart Institute in Houston.

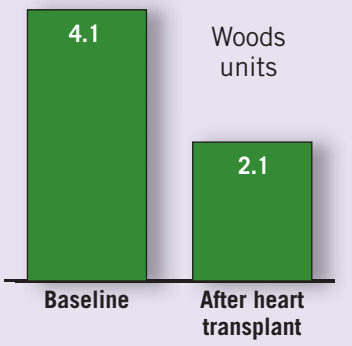
His study reviewed 55 patients with heart failure and secondary pulmonary hypertension who received an LVAD as a bridge-to-transplant. At baseline, their average pulmonary vascular resistance was 4.1 Woods units, mean pulmonary artery pressure was 38.8 mm Hg, average pulmonary capillary wedge pressure was 27.3 mm Hg, and mean transpulmonary gradient was 15.5 mm Hg.

The patients were on LVAD treatment for an average of 8 months; about 40% were treated with a pulsatile pump and the other 60% with an axial-flow device.

All 55 patients had a heart transplant. Following transplant, all of their pulmonary pressure values showed resolution of hypertension. The average pulmonary vascular resistance fell to 2.1 Woods units, average pulmonary artery pressure was 23.0 mm Hg, average pulmonary capillary wedge pressure dropped to 12.6 mm Hg, and mean transpulmonary gradient fell to 10.2 mm Hg, Dr. Jacob said. The pulsatile and axial-flow devices produced similar reductions in pulmonary hypertension.

"We think that by resolving pulmonary hypertension, LVAD treatment may reduce the risk for right heart failure after heart transplantation," he said.

Average Pulmonary Vascular Resistance After Heart Transplant



Note: Based on 55 patients who were on left ventricular assist device treatment for an average of 8 months before transplant.
Source: Dr. Jacob

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The second review presented at the meeting included 13 patients with severe pulmonary hypertension who received an axial-flow LVAD during June 2005–May 2007 at the University of Minnesota in Minneapolis. At baseline, the patients' pulmonary vascular resistance was an average of 5.3 Woods units, transpulmonary gradient was a mean of 18.3 mm Hg, and systolic pulmonary artery pressure averaged 62.9 mm Hg. Following 3 months of treatment with an axial-flow LVAD as a bridge-to-transplant device, their average pulmonary vascular gradient was 2.7 Woods units, average transpulmonary gradient was 11.1 mm Hg, and mean systolic pulmonary artery pressure was 40.0 mm Hg, reported Forum Kamdar, a researcher in the division of cardiothoracic surgery.

Although Ms. Kamdar and her associates said that these results showed the efficacy of LVAD placement for resolving pulmonary hypertension, the clinical history of the patients was more complicated, because 12 of them received an intra-aortic balloon pump before placement of their LVAD. All three measures of pulmonary hypertension showed substantial improvement after treatment with the balloon pump. Four patients also were treated with an advanced vasodilator drug, sildenafil, before receiving an LVAD. ■

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