

## Postop Neurocognitive Dip Tied to High CRP Levels

BY DOUG BRUNK  
San Diego Bureau

SAN DIEGO — Increased levels of C-reactive protein and other markers of perioperative inflammatory response are associated with neurocognitive decline following cardiac surgery, Dr. Basel Ramlawi said at a congress sponsored by the Association for Academic Surgery and the Society of University Surgeons.

Dr. Ramlawi and his associates prospectively evaluated 41 patients who underwent coronary artery bypass graft and/or valve procedures that used cardiopulmonary bypass. The patients' mean age was 67 years. All patients had neurocognitive testing preoperatively, postoperatively at day 4, and at 3 months. The validated tests took 45 minutes to administer and covered memory, executive function, naming, attention, fluency, and premonitory intelligence, said Dr. Ramlawi of the division of cardiothoracic surgery at Harvard Medical School, Boston. Neurocognitive decline was defined as performing one standard deviation from baseline on at least 25% of tasks.

Study participants also underwent serum testing preoperatively, postoperatively at 6 hours, and at 4 days. Levels of C-reactive protein (CRP) and of interleukin 1 $\beta$ , IL-6, and IL-10 were assessed, and an increase of serum tau protein after surgery was used as a marker of axonal central nervous system damage.

Of the 41 patients, 7 (17%) developed neurocognitive decline. Baseline characteristics and predictors of neurocognitive decline such as age, education level, and perioperative

temperature did not differ significantly between patients with and without postoperative neurocognitive decline.

However, patients who experienced postoperative neurocognitive decline had significantly greater increases of CRP, IL-1 $\beta$ , and IL-10 than those who had no decline.

In addition, the level of tau protein was increased 78% in patients with neurocognitive decline, compared with 29% in their counterparts who did not show a decline.

"There exists a significant association [between] the magnitude and persistence of the perioperative inflammatory response and neurocognitive decline in this cohort," Dr. Ramlawi said. "This association is likely mediated by axonal damage."

According to the medical literature, the incidence of neurocognitive decline is 20%-60% in the first 2 weeks after cardiac surgery. "It can range from 5% to 40% for periods up to 5 years after surgery," he said, adding that the etiology of this complication is not known.

"It is likely a multifactorial problem," Dr. Ramlawi said. "Several theories have been assessed. The most obvious one is ischemia. Any microemboli might cause this."

Other possible factors include anesthesia, perioperative hypothermia, and low level of education.

"While there have been certain markers of brain injury following cardiopulmonary bypass, very few have been associated with clinical outcomes and neurocognitive decline," he said. "Tau protein, on the other hand, assesses axonal damage and has not been [studied] in cardiac surgery before." ■

## Clampless CABG May Lower Risk of Postoperative Stroke

BY DIANA MAHONEY  
New England Bureau

ORLANDO — Performing a coronary artery bypass graft without the aortic clamp appears to minimize the risk of postoperative cerebrovascular accidents independent of the use of cardiopulmonary bypass, said Dr. Michael F. Gibson at the annual meeting of the Southern Thoracic Surgery Association.

Neurologic dysfunction is a common complication after cardiac surgery. Despite significant advances in cardiopulmonary bypass (CPB) technology, surgical techniques, and anesthesia management, central nervous system complications occur in a large number of patients undergoing surgery requiring CPB, he said.

Many comparisons between traditional arrested-heart coronary artery bypass graft (CABG) and off-pump coronary artery bypass (OPCAB) have therefore concentrated on the contribution of the cardiopulmonary bypass machine to the potential adverse outcomes, said Dr. Gibson, of the University of Oklahoma Health Sciences Center, Oklahoma City.

In contrast, in a recent investigation, Dr. Gibson and his colleagues evaluated the clinical neurologic outcomes in patients undergoing arrested-heart CABG, beating-heart cardiopulmonary bypass CABG (BHCAB), and OPCAB in whom no

aortic clamp was used to restrict blood flow to the graft area.

The study included 424 patients who underwent coronary artery bypass surgery at the Health Sciences Center between July 2000 and April 2004. All the procedures were performed without the placement of an aortic clamp, and all were started as OPCAB and converted to BHCAB as required by the clinical situation, he said.

Of the 424 patients, 213 underwent CABG, 134 underwent OPCAB, and 77 underwent BHCAB. During the study period, no BHCAB or OPCAB patients were converted to CABG.

All of the patients were evaluated postoperatively for clinical neurologic outcomes. Of the patients, six who underwent CABG and none who underwent BHCAB or OPCAB experienced clinically obvious cerebrovascular accidents (CVAs) in the immediate postoperative period.

"The fact that there were no immediate postoperative CVAs in the off-pump and beating-heart CPB patients implies that the application of the aortic clamp, rather than the use of cardiopulmonary bypass, is the more important culprit for such adverse outcomes in CABG surgery," said Dr. Gibson. "Routine clampless surgery minimizes the CVA risk and may be the most important improvement that is easily obtainable with the use of off-pump and beating-heart surgery techniques." ■

## Hyperglycemia Flags Poor Outcome After Cardiac Surgery in Infants

SAN FRANCISCO — The longer infants experience hyperglycemia following cardiac surgery, the greater their morbidity and mortality, Dr. Andrew R. Yates reported in a poster presentation at the annual congress of the Society of Critical Care Medicine.

Infants who have hyperglycemia for 7 days or more have close to a 100% chance of morbidity and a 50%-60% chance of mortality, according to Dr. Yates and his colleagues from Ohio State University, Columbus.

Their retrospective chart review involved 184 patients younger than 1 year who underwent cardiac surgery requiring cardiopulmonary bypass. At baseline, infants who weighed less than 2 kg; those with liver or renal insufficiency, or diabetes; or those requiring extracorporeal circulation membrane oxygenation (ECMO) were excluded.

The average age of the infants was 4.3 months, and their average weight was 4.9 kg. Of the 184 patients, 21 (11.4%) died. Duration of hyperglycemia was significantly associated with liver insufficiency, renal insufficiency, infection, CNS events, the need for dialysis, the need for ECMO, and a composite measure of morbidity.

Two other measures of hyperglycemia—initial glucose level and peak glucose level—had somewhat weaker associations with various forms of morbidity. Both measures were significantly associated with the composite morbidity measure.

—Robert Finn

## ACP Aids Survival in High-Risk Neonates

BY PATRICE WENDLING  
Chicago Bureau

CHICAGO — Antegrade cerebral perfusion offers a survival advantage for high-risk newborns undergoing single-ventricle palliation, Dr. Robert Hannan said at the annual meeting of the Society of Thoracic Surgeons.

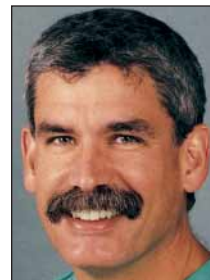
He reported on a retrospective analysis of 126 consecutive Rachs-1 category 6 patients who underwent stage 1 palliation of hypoplastic or nonhypoplastic left heart syndrome or a Damus-Kaye-Stansel procedure with either deep hypothermic circulatory arrest or antegrade cerebral perfusion at the Congenital Heart Institute at Miami Children's Hospital from 1995 to 2004.

In early 2001, hospital staff decided to limit the use of deep hypothermic circulatory arrest (DHCA) because of reports on the efficacy and safety of antegrade cerebral perfusion (ACP) and because of what Dr. Hannan called, "persuasive evidence that prolonged periods of deep hypothermic arrest lead to higher short- and long-term morbidity."

A total of 67 patients were repaired with prolonged DHCA, and

59 with ACP and a short period of DHCA. Dr. Hannan and colleagues further stratified the groups into high-risk (weight less than 2.5 kg or other cardiac diagnosis) and usual-risk groups.

Patients were typically perfused through a shunt at the subclavian-innominate junction during arch re-



**At 1 year, the ACP group continued to have a significant survival advantage over the DHCA group (76% vs 54%).**

DR. HANNAN

construction. Pulmonary artery transection was performed with the body perfused and the heart beating, he said. Circulatory arrest was used for changing the position of the cannulas and the atrial septectomy.

The 30-day survival was significantly higher in the ACP group than the DHCA group (90% vs. 70%). The high-risk ACP patients had a trend toward increased survival, compared with their DHCA coun-

terparts (80% [12/15] vs. 62% [8/13]). But the difference was not significant.

At 1 year, the ACP group continued to have a significant survival advantage over the DHCA group (76% [45/59] vs. 54% [36/67]). But disappointingly, the high-risk groups continued to show a high interim mortality (48% [7/15] vs. 39% [5/13]), he said.

In the DHCA era, there were 32 deaths among 67 patients (48%), compared with 17 deaths in 59 patients in the ACP era (29%).

Cox regression analysis determined that an increase of just 1 kg in the weight of patients below 2.5 kg would lower the risk of death by 47%.

Dr. Hannan acknowledged that multiple changes were made during the study period in the hospital's perfusion strategy, ICU management, and anesthesia practices that confounded the effect of ACP. Perfusion changes included the adoption of a mixed alpha-stat/pH-stat strategy to manage acid base status, increased hematocrit while on bypass, and hyperoxygenation. ■