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## Perioperative Medicine

*J. Lance Lichtor, M.D., and Joseph F. Antognini, M.D., Editors*

### Strokes after cardiac surgery and relationship to carotid stenosis. *Arch Neurol* 2009; 66:1091–6

Cerebrovascular complications, such as stroke, are a common source of morbidity and mortality after cardiac surgery. Although the cause of postoperative stroke is multifactorial, significant carotid stenosis is a positive predictor. Carotid and cardiac surgical procedures are often combined to reduce the risk of stroke; however, this may actually increase adverse events, including stroke.

This retrospective study at a single tertiary care hospital was conducted to critically examine the role of significant carotid stenosis in the pathogenesis of postoperative stroke after cardiac operations. A total of 4,335 patients undergoing coronary artery bypass grafting, aortic valve replacement, or both were enrolled. Clinically definitive stroke was detected in 1.8% of patients undergoing cardiac operations during the same admission. Only 5.3% of these strokes were of the large vessel type, and most strokes (76.3%) occurred without significant carotid stenosis. In 60% of cases, strokes identified using computed topographic head scans were not confined to a single carotid artery territory.

Stroke occurred without direct correlation to significant carotid stenosis in 94.7% of patients. Patients who underwent combined carotid and cardiac operations had an increased risk for postoperative stroke (15.1%). None of the patients with a similar degree of carotid stenosis, but who underwent cardiac surgery alone, had a postoperative stroke ( $P = 0.004$ ).

#### Interpretation

A small percentage of patients who had cardiac surgery (bypass grafting and aortic valve replacement) suffered strokes; however, more than 90% of these were not correlated to significant carotid stenosis. Combination of cardiac and carotid surgery increased the risk for stroke. The authors conclude that combining cardiac surgery with carotid surgery is unnecessary.

### Pediatric pain after ambulatory surgery: Where's the medication? *Pediatrics* 2009; 124:e588–95

Annually, more than 5 million children undergo surgery in the United States. Although up to 75% of these patients experience significant postoperative pain, there have been few trials assessing pain management at home. Poor postoperative pain is linked to increased unscheduled medical visits, mostly to pediatricians.

A controlled study of 261 children, up to 12 yr of age, undergoing routine tonsillectomy and adenoidectomy surgery was conducted to assess pediatric postoperative pain control. Baseline data were collected before surgery, a standardized approach to anesthesia and surgical procedures was used, and pain and analgesic consumption were recorded for 2 weeks at home.

At the time of discharge, 27% of children were rated by nurses as experiencing pain levels greater than 30 on a scale of 0 to 100. Parents rated 77% of children as experiencing significant overall pain on the first day at home, 49% 1 week after surgery, and 7.5% 2 weeks after surgery based on the parent's postoperative pain measure scores. However, on the first day at home, 24% of children received 0 or 1 medication dose throughout the entire day. Overall, 23% of children received less than or equal to three doses of analgesic medications throughout the entire 2-week period at home. Of the 16 possible doses of analgesics administered at home, 71% of children received fewer than one half of these.

Many pediatric patients received inadequate postoperative analgesics. No significant differences in medication received were observed among groups with low, moderate, or severe pain postoperative pain measure ratings. It remains unclear why there is such a large discrepancy between the postoperative pain measure and the analgesia administered.

#### Interpretation

Children who underwent tonsillectomy surgery experienced significant postoperative pain as rated by their parents. However, a large fraction received little analgesic medications to treat the pain. More work is needed to determine what obstacles prevent these children from receiving adequate pain relief.

### Downwardly mobile: The accidental cost of being insured. *Arch Surg* 2009; 144:1006–11

In 2007, 45.7 million Americans (15.3%) were uninsured, and it is estimated that there will be another 10 million uninsured in the next 10 yr. Several studies have demonstrated disparities in screening, hospital admission, treatment, and outcomes because of insurance status. Uninsured adults had a 25% higher risk of mortality than insured adults. Despite preventive regulations such as the Emergency Medical Treatment and Active Labor Act, a disparity in outcomes for trauma patients (in-hospital death) may occur. To evaluate the potential disparities in trauma outcomes, data were collected from the National Trauma Data Bank from 2002 through 2006, including information from 2.7 million patients admitted for traumatic injury to more than 900 U.S. trauma centers.

Black and Hispanics had a higher odds of being uninsured compared with white patients (3.29 *vs.* 4.36) as did male patients compared with female patients. Using in-hospital death as the dependent variable, unadjusted results revealed a significantly higher mortality for uninsured patients (odds ratio [OR], 1.39;  $P < 0.001$ ); this remained true when sex, race, age, Injury Severity Score, Revised Trauma Score, and injury mechanism were controlled (OR, 1.80;  $P < 0.001$ ). In a subgroup analysis of young patients unlikely to have comorbidities, uninsured patients had a significantly higher mortality (OR, 1.89;  $P < 0.001$ ), as did patients with head injuries (OR, 1.65;  $P < 0.001$ ) and patients with one or more comorbidities (OR, 1.52;  $P < 0.001$ ).

### Interpretation

Uninsured patients who suffered penetrating or blunt trauma had a higher risk-adjusted mortality rate compared with patients who were insured. Possible reasons for this disparity include treatment delay and differing care.

### Impact of left ventricular assist device bridging on posttransplant outcomes. *Ann Thorac Surg* 2009; 88:1457–61

Demand for donor hearts is higher than the supply, and therefore, bridging options such as left ventricular assist device (LVAD) and intravenous inotropes may be used in patients who are not effectively stabilized with conservative measures. However, there are conflicting data regarding the short- and long-term efficacy of LVAD therapy.

A retrospective review was performed to evaluate outcomes in United Network of Organ Sharing status 1 heart transplant recipients who were bridged to transplant with an implantable LVAD ( $n = 86$ ) or with intravenous inotropes only ( $n = 173$ ) from 1994 to 2007.

Although patients had similar baseline characteristics and pretransplant hemodynamics, patients in the LVAD group had a significantly higher incidence of mechanical ventilation at the time of transplant (6.7% *vs.* 4.6%;  $P < 0.02$ ). Hemodynamics, as measured by cardiac index, pulmonary vascular resistance, central venous pressure, and pulmonary capillary wedge pressure, significantly improved in the LVAD group.

	LVAD ( $n = 86$ )	Intravenous Inotropes ( $n = 173$ )	<i>P</i>
Survival, %			
30 d	96.7	98.3	—
1 yr	84.9	88.1	—
3 yr	79.1	77.1	—
5 yr	72.7	76.1	—
Length of stay, mean days $\pm$ SEM			
Total	21 $\pm$ 16	14 $\pm$ 14	0.15
Intensive care unit	5 $\pm$ 3	6 $\pm$ 6	0.41

The incidence of posttransplant infectious complications and rejection episodes during the first year was similar. However, the incidence of posttransplant renal dysfunction was higher in patients bridged with inotrope.

### Interpretation

In patients with end-stage heart failure, intravenous inotropes or LVADs can be used as a bridge before heart transplantation. In the past, mortality was high in patients receiving LVAD implantation. However, using newer generation LVAD devices, both short-term and long-term survival and morbidity after transplantation were similar to patients who received only inotropic infusions.

### Critical Care Medicine

Jean Mantz, M.D., Ph.D., Editor

### IV drug administration during out-of-hospital cardiac arrest: A randomized trial. *JAMA* 2009; 302:2222–9

Epinephrine is widely used as an integral part of advanced cardiac life support (ACLS) despite a paucity of clinical data supporting its use with cardiopulmonary resuscitation. Recent studies have demonstrated a potential association with epinephrine and poor outcomes.

To determine whether removing intravenous drug administration from an ACLS protocol would improve survival to hospital discharge after out-of-hospital cardiac arrest, a prospective, randomized controlled trial was conducted. Consecutive adult patients ( $n = 418$  ACLS with intravenous drug administration and  $n = 433$  ACLS without intravenous drugs) with out-of-hospital nontraumatic cardiac arrest treated within the emergency medical service system were included.

Short-term survival was significantly longer in patients who received intravenous drugs and ACLS compared with ACLS alone ( $P = 0.004$ ). However, the rates of survival to hospital discharge (10.5% *vs.* 9.2%;  $P = 0.61$ ), survival with favorable neurologic outcome (9.8% *vs.* 8.1%;  $P = 0.45$ ), and survival at 1 yr (10% *vs.* 8%;  $P = 0.53$ ) were similar between the two groups. No difference in the quality of cardiopulmonary resuscitation was observed. After adjustment for ventricular fibrillation, response interval, witnessed arrest, or arrest in a public location, there was no significant difference in survival to hospital discharge for the ACLS plus intravenous drug administration group *versus* the ACLS-alone group.

### Interpretation

These results indicate an apparent lack of long-term benefit of epinephrine and other intravenous medications in the management of out-of-hospital cardiac arrest. The results should be interpreted with caution because the study overes-