

REPORTS OF SCIENTIFIC MEETINGS

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Fourth Annual Meeting of the Society of Cardiovascular Anesthesiologists

The fourth annual meeting of the Society of Cardiovascular Anesthesiologists (May 3–5, 1982) in Washington, DC, opened with a debate on anesthesia for vascular surgery which was moderated by M. Roizen. A. Quasha contended that drugs to protect the kidney should be administered prior to aortic cross-clamp because prophylactic mannitol administration prior to renal ischemia would reduce the incidence of oliguria and improve renal function. Conversely, L. Fagraeus held that most problems encountered in vascular surgery are the result of hypovolemia, that optimal volume loading can nearly eliminate postoperative ischemic renal failure, and that the most commonly used diuretic agents have not been shown to prevent renal failure. On the topic of EEG monitoring during carotid artery surgery, B. Grundy stated that neurologic deficits which presented immediately after the operation could be predicted by intraoperative EEG changes and that the severity of the intraoperative EEG changes correlated with the degree of regional cerebral ischemia. In rebuttal, M. Roizen emphasized that false-positive EEG analysis may cause unnecessary placement of a temporary shunt. He stated that there were no definitive data to indicate that intervention once EEG abnormalities are present leads to reduced perioperative morbidity. D. Cullen advocated the use of Swan Ganz® catheters in patients undergoing abdominal aortic surgery because these patients are at a higher risk to develop cardiovascular, respiratory, renal, and cerebral complications. On the other hand, W. Hamilton stated that many of the physiologic changes that occur could be detected or predicted by careful observation and a detailed knowledge of the patient's disease.

The Janssen annual lecture was delivered by Dr. Arthur C. Guyton on the topic: "Basic Principles of Cardiac Output and Arterial Pressure Control." Dr. Guyton stated that cardiac output is determined by total peripheral resistance as long as the arterial pressure remains constant. When oxygen in the tissue is reduced, blood vessels relax, decreasing local resistance and increasing flow. When blood vessels dilate in any part of the body to supply needed flow, cardiac output automatically increases. The essential principle of normal cardiovascular function is the maintenance of a normal arterial pressure in the face of changes in resistance; this allows the individual tissues of the body to control their own blood flow independently of blood flows in all other tissues.

In the Basic Science Update section, M. Snyder stressed the importance of right ventricular function. He stated that the right ventricle operates at a lower pressure and a lesser inotropic state than the left ventricle, but that right ventricular failure can be just as disastrous as left ventricular dysfunction. W. Levy and G. Gravlee presented an evaluation of cardiac output computers. Much of the lack of precision of the technique is due to inaccuracy in measuring the temperature of

the injectate. J. Flacke moderated a panel which discussed narcotic reversal following open heart or cardiovascular surgery. I. Azar enumerated the adverse effects of naloxone: severe hypertension, ventricular fibrillation, pulmonary edema, and sudden death. Dr. Azar stated that naloxone reverses the antihypertensive effect of clonidine, and, since endorphins normally play a role in the control of blood pressure, their sudden displacement by naloxone from the receptors may cause severe hypertension. J. Flacke discussed the central cardiovascular effects of narcotics and the endogenous opiate system.

The panel on intraoperative ischemia, old and new, was moderated by J. Waller. F. Estafanous discussed the role of perioperative nitroglycerin in the management of ischemia. Currently, the use of nitroglycerin during different stages of cardiac surgery is an important adjuvant to myocardial preservation techniques. S. Teasdale discussed the problems of measuring cardiac ischemia and presented the following conclusions: 1) Pulmonary capillary wedge pressures in the range of 8–12 mmHg are the most advantageous for cardiac metabolism after cardiopulmonary bypass; 2) Pressures less than 6 mmHg or higher than 15 mmHg are associated with myocardial lactate production; and 3) When hypertension occurs, a moderate decrease in blood pressure improves cardiac metabolism, whereas lowering blood pressure to preoperative levels produces cardiac ischemia. S. Thomas advocated nitrates, beta blockers, and alpha agonists as integral parts of the anesthetic rather than drugs of last resort. He stated that the emphasis on choosing either a "pure narcotic" or "pure inhalation technique" to manage patients with coronary artery disease obscured the benefits of a combination of the two.

The panel entitled Myocardial Protection: 1982 was moderated by C. Christian. M. Nugent showed that regional ischemia with marked regional dysfunction may occur without ECG changes or changes in indices of global function. The decrease in contractility, heart rate, and afterload seen with halothane could improve the myocardial oxygen supply/demand relationship. C. Christian divided cardioplegia into three components which address the problem of global ischemia. 1) Energy conservation is the most important aspect and immediate diastolic arrest must be obtained to preserve energy substrates (potassium cardioplegia). 2) Hypothermia provides protection below 24° C. This method provides more protection than all other methods combined. 3) Various components (magnesium, ATP, creatine phosphate, etc) can be added to the cardioplegic solution to minimize ischemic changes. The solution should be easy to formulate, store, and use. E. Buttner stated that the principles and methods of inducing reversible cardioplegic arrest include potassium arrest, membrane depolarization by fast sodium channel deactivation (local anesthetics), elimination of electrical activity by low sodium concentration, and electromechanical dissociation (low calcium concentration). Reperfusion injury by improper management

of the postischemic period may undo the benefits of cardioplegia. A. Wechsler discussed optimization of myocardial protection. He showed that rewarming may occur more rapidly in the right ventricle than in the left and that high energy phosphate stores may be lower in the right ventricle than expected. The hypertrophic ventricle has abnormal high energy phosphate stores and is more susceptible to ischemic injury.

Selected scientific papers included a study by J. Tinker which discussed the myocardial oxygen utilization efficiency of four different anesthetics. At low external work levels, hearts anesthetized with halothane and enflurane consumed less oxygen per unit of external cardiac work produced than did hearts anesthetized with fentanyl; isoflurane was intermediate between the two extremes. Increasing the workloads to higher levels abolished these differences in myocardial oxygen utilization efficiency. He postulated that these differences in oxygen consumption and efficiency might result from the intrinsic inotropic state of the hearts anesthetized by various agents.

N. Lawson reported that verapamil administered in the dosage range recommended for treatment of supraventricular dysrhythmias in humans can produce 30% depression of the indirectly stimulated striated muscle twitch height. R. Kates reported that verapamil administered prior to cardiopulmonary bypass for cardiac surgery caused significant decreases in mean arterial pressure, systemic vascular resistance, and left ventricular stroke work index.

M. Calahan reported on intraoperative monitoring with transesophageal echocardiography in patients anesthetized with halothane, enflurane, isoflurane. He determined that end-diastolic diameter and fractional shortening was not different between the two groups but that circumferential fiber shortening was greater in the isoflurane group. He postulated that the velocity of left ventricular contraction might slow without decreasing the extent of contraction and therefore circumferential fiber shortening may be of more sensitive marker of global left ventricular function. P. Van Trigt discussed the mechanism of halothane-induced myocardial depression. Analysis of the end-systolic pressure-volume relationship showed a significant dose-dependent decrease in inotropic state, but passive elastic properties which were described in terms of logarithmically transformed elastic coefficients did not change significantly. He concluded that the negative inotropic effect of halothane is attributed solely to depression of systolic function and is independent of any change in diastolic mechanics. L. Fagraeus discussed the ino-

tropic effects of isoflurane on the hypertrophic left ventricle in terms of changes in the slope of the end-systolic pressure-volume relationship. His results showed no deterioration in contractility at 1.25% isoflurane, whereas 2% isoflurane caused significant inotropic deterioration. He suggested that isoflurane at moderate concentrations may be used safely for general anesthesia in patients with stable left ventricular hypertrophy. T. Curling discussed concomitant carotid and coronary artery surgery in terms of management, morbidity, and mortality, and concluded that concomitant carotid endarterectomy and myocardial revascularization performed with the anesthetic techniques and surgical approaches at his institution resulted in the same risks and results obtained when myocardial revascularization alone was undertaken.

Selected posters included: M. Roizen's presentation on monitoring with transesophageal two-dimensional echocardiography which might be more sensitive than conventional means for detecting left ventricular regional dysfunction. C. Christian described the effects of isoflurane on global ventricular mechanics, characterizing inotropic state by the slope of the end-systolic pressure-volume relationships. Isoflurane had only minor effects at 1.25% concentration but the severe depression seen at 2% may reflect changes in the diastolic properties of the ventricle rather than inotropic depression. A. Safwat reported that a 10 $\mu\text{g}/\text{kg}$ bolus of propranolol 5 minutes prior to laryngoscopy was an effective way of controlling rate-pressure product during rapid sequence induction. B. Murphy reported that 10 centimeters of water positive end-expiratory pressure was not effective in reducing postoperative bleeding following cardiac surgery.

C. Lake described the determinants of direct ventricular defibrillation following ischemic arrest and concluded that optimal efficiency and safety of defibrillation would occur when the initial D.C. shock of 3 joules or greater was delivered after more than 8 minutes of coronary reperfusion when the myocardial temperature is greater than 33° C, and the serum potassium is in the mid to high normal range.

The next meeting of the Society will be held April 24-27, 1983, San Diego, California at the Sheraton Harbor-Island Hotel.

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