BRIEFS FROM THE LITERATURE

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Briefs were submitted by Drs. Peter P. Bosomworth, M. T. Clarke, Martin Helrich, J. J. Jacoby, F. C. McPartland, S. J. Martin, R. E. Ponath, William Rabenn, R. W. Ridley, and H. S. Rottenstein. Briefs appearing elsewhere in this issue are a part of this column.

CIRCULATION AND ANESTHESIA Tissue survival is most likely in the presence of drugs which interfere minimally with the responses of the fine circulation to their normal stimuli (including catecholamines). Ether, halothane, cyclopropane, and thiopental share some similarities in their effect on circulation and yet have many different effects. The significance of present, superficial observations must be conjectural. Deeper understanding awaits better methods and measurements. Maintenance of near normal levels of myocardial contractility during cyclopropane anesthesia depends on the high level of sympathetic tone which the drug elicits. Ether seems to "sensitize" the carotid sinus mechanism and to act in the central nervous system in some manner which provokes a rather general increase in sympathetic nervous activity. Sympathetic nervous activity is relatively weak during halothane anesthesia and the effectiveness of whatever activity does exist is reduced by peripheral actions of the anesthetic. The salient hemodynamic feature of thiopental anesthesia is that arterial pressure is well maintained while cardiac output and tissue blood flow are reduced. This implies increased vascular resistance. (*Price, H. L.: Circulatory Actions of General Anesthetic Agents and Homeostatic Roles of Epinephrine and Norepinephrine in Man, Clin. Pharmacol. Ther. 2: 163 (Mar.–Apr.) 1961.*)

BLOOD VOLUME The major determining factor in the regulation of blood volume appears to be the osmotic pressure of the extracellular fluid. The regulation of the extracellular fluid volume seems to depend on sensory information from volume receptors in the low and high pressure sides of the circulation. The extracellular fluid volume is corrected by changes in the circulating blood volume which in turn results from changes in urinary water and electrolyte output. The low pressure receptors control renal water output by varying the level of secreted antidiuretic hormone. The high pressure system receptors seem to regulate the sodium output by varying the production of aldosterone. Uncertainty exists as to the role of additional regulation of urinary sodium excretion by a natriuretic hormone secreted in the midbrain and/or renal hemodynamic control of the tubular concentrating mechanism. (*Pearce, J. W.: A Current Concept of Regulation of Blood Volume, Brit. Heart J. 23: 66 (Jan.) 1961.*)

IRREVERSIBLE SHOCK A series of 105 patients who died in a state of irreversible shock after surgical operation was studied. In 99 patients (94.3 per cent) a definite etiologic factor could be found either on a clinical or on a pathologic basis. Hemorrhage was the underlying cause in 32 patients, a site of continuing hemorrhage being found at postmortem examination. It is suggested that failure to remove an underlying initiating cause is the chief factor in the lack of response to treatment in "irreversible shock" following surgical operation, and that a significant number of such deaths may be prevented by surgical intervention at the optimal time. (*Davis, H., and others: "Irreversible" Shock Following Surgical Operation in Man, West. J. Surg. 69: 1 (Jan.–Feb.) 1961.*)

SHOCK Two hours of hemorrhagic shock so weakens the anti-bacterial defense that gram negative bacteria, as well as gram positive bacteria, can be grown more readily in the "shocked" animal than in the normal. However, the number of bacteria that can be recovered is too small to be of any significance in the endotoxemia of advanced hemorrhagic shock. (*Frank, E. D., and others: Effect of Hemorrhagic Shock on Viability of Invading Bacteria, Proc. Soc. Exp. Biol. Med. 106: 394 (Feb.) 1961.*)

SHOCK The coronary resistance and coronary sinus blood flow in dogs fall to about half their control levels during acute hemorrhagic shock in open-chested anesthetized dogs. The peripheral flow decreases as the resistance rises. Despite an inadequate pressor response, use of blood transfusion during shock is helpful in restoring both coronary and peripheral flows and resistance toward normal. Coronary flow increases and coronary vascular resistance decreases with the use of norepinephrine while peripheral effects are exaggerated. Norepinephrine protects the myocardium and thus may be a helpful but temporary measure in treating shock while other procedures are carried out to treat the cause. (*Vowles, K. D., and others: Studies of Coronary and Peripheral Blood Flow Following Hemorrhagic Shock, Transfusion and L-Norepinephrine, Ann. Surg. 153: 202 (Feb.) 1961.*)

HEART-LUNG MONITORING The maintenance of a normal physiologic state during extracorporeal circulation is difficult. No specific routine meets the needs of all patients. Some patients die from inexplicable causes during or after open-heart operations. Difficulties may be related to alterations in blood gas or acid-base balance. To avoid damage to the blood by excessive trauma in the pump, and to keep the blood gases close to normal, continuous monitoring should be carried out. Pump speed, rotator disc speed, and gas flow are adjusted to meet patient requirements. Moment to moment information is provided by continuous monitoring of venous and arterial blood pressures, electroencephalogram, electrocardiogram, rectal, esophageal, and blood temperatures, venous and arterial oyxgen tensions, and arterial blood pH. (*Paton, B. C., Montgomery, V., and Swan, H.: Methods for Control of Extracorporeal Circulation, A. M. A. Arch. Surg. 82: 405 (Mar.) 1961.*)

MECHANOCARDIAC MASSAGE Manual cardiac massage was compared with mechanical massage. Hand massage can maintain a satisfactory pressure response in both the pulmonary and systemic circulation. Mechanical compression of the heart using a pulsating balloon between the ventricles and the pericardium maintains adequate pressures. Heart trauma from prolonged mechanical massage is less than that from manual methods. Wide variations in flow and pressure response are frequently obtained with manual massage due to changes of position of the operator's hands while compressing the heart. Fatigue of the hand occurs in three to seven minutes depending on the rate of compression. A mechanocardiac pulsator is recommended in cases requiring prolonged cardiac massage. (*Jones, C. A., and others: Fundamental Studies on Maintenance of Circulation in Cardiac Asystole by Mechanocardiac Pulsator, Dis. Chest 39: 207 (Feb.) 1961.*)

CARDIAC DEFIBRILLATION If defibrillation is to be successful, fibrillation must cease completely in every fraction of the myocardium. If even a vestige of fibrillating muscle remains, coordinate contractions never develop. Successful defibrillation can be accomplished by means of relatively weak (100–170 volts), short-duration (0.15–0.30 second) alternating current shocks if the electrodes cover a large portion of the heart. During cardiac resuscitation procedures, there should be no hesitation to use epinephrine, in spite of warnings to the contrary. Sufficient cardiac tone helps prevent vigorous massage from damaging the myocardium. The use of rapidly-acting cardiac glycosides (ouabain, acetyl strophanthidin) is indicated, especially if prolonged massage and multiple episodes of defibrillation are necessary. A hypothermic state with a decreased threshold to ventricular fibrillation may develop in patients (especially infants) undergoing prolonged surgery and in patients requiring large quantities of blood. Maintenance of normal