

ination. In 14 cases where recovery took place rapidly, a remarkable diuresis occurred. The author's experience with this method of management has been encouraging and deservers continued trial. (Poisevert, M., and others: *The Treatment of Shock and Circulatory Distress With a Combination of Isoprotenerol and Hydrocortisone*, *J. Chir. (Paris)* 92: 131 (Sept.) 1966.)

CARDIAC MASSAGE The complications following closed chest cardiac massage includes such trauma as fractured liver, ruptured spleen, fractures of the ribs, hemothorax, and hemoperitoneum. One case of a large hematoma of the transverse mesocolon is reported. One case of perforation of the stomach is reported which may have been due to overdistension by mouth-to-mouth respiration. In this article a case is reported of a 47 year old physician who had cardiac arrest followed by external cardiac massage for less than three minutes. He had severe pain in the chest following this, but roentgenograms showed no evidence of fractures or other trauma. On the sixteenth hospital day, he developed a temperature of 103° F. and pain in the right upper abdomen. A mass was felt, and the abdomen was explored on the following day. An abscess was found in the right upper quadrant arising from a perforation of the transverse colon just distal to the hepatic flexure. Treatment was associated with a number of complications but the patient finally left the hospital. It is postulated that there was an initial trauma causing edema and interstitial hemorrhage of the bowel wall and a hematoma of the mesentery, and that these lesions ultimately progressed to necrosis and perforation of the bowel wall. One other case is cited in which a patient developed a large area of infarction of the small bowel secondary to an embolus originated from a mural thrombus which was forced into the systemic circulation during the time of chest compression. (Tobias, S.: *Perforation of the Transverse Colon Following External Cardiac Massage*, *Arch. Surg.* 94: 335 (March) 1967.)

VASOPRESSORS The effects of infusing norepinephrine, phenylephrine and angiotensin at different rates in dogs, and of infusing nor-

epinephrine in man were studied. Norepinephrine 0.2 $\mu\text{g./kg./minute}$ decreased urine volume about 60 per cent but had no other significant effects. Norepinephrine 0.3 $\mu\text{g./kg./minute}$ initially elevated blood pressure and reduced pH, standard bicarbonate, urine flow and creatinine clearance. Norepinephrine 1 $\mu\text{g./kg./minute}$ produced a more marked metabolic acidosis, hypovolemia and death. Neosynephrine 10 $\mu\text{g./kg./minute}$ had a similar effect to norepinephrine 1 $\mu\text{g./kg./minute}$, however, angiotensin 4 $\mu\text{g./kg./minute}$ produced transient changes of the same nature. Infusion of norepinephrine in phlebotomized dogs rapidly produced acidosis and death. In man, 2 $\mu\text{g./kg./minute}$ of norepinephrine resulted in changes in the same direction as the animal experiments. Infusion of sodium bicarbonate reversed the changes produced by norepinephrine and prevented death. (Morris, R. E., Jr., Thomas, T. D., and Robinson, P. *Metabolic Effects of Vasopressor Agents*, *Bull. N. Y. Acad. Med.* 42: 1007 (Nov.) 1966.)

FRESHLY DRAWN BLOOD The use of freshly drawn blood for transfusion should be justified by the clinical and laboratory findings manifested by the patient in relation to the known effects of storage of blood. Clinical situations for which freshly drawn blood is often requested are: (a) treatment of chronic anemia; (b) bleeding due to thrombocytopenia; (c) blood for extracorporeal circulation; (d) correction of leukopenia; (e) hemolytic disease of the newborn; (f) treatment of coagulation disorders; (g) burns; (h) severe liver disease; and (i) blood for hemodialysis. A review of these situations reveals that only rarely are there indications for issuance of freshly drawn blood. In most situations an appropriate blood component, or relatively fresh blood, rather than freshly drawn blood is preferable. (Oberman, H. A.: *The Indications for Transfusion of Freshly Drawn Blood*, *J.A.M.A.* 199: 93 (Jan.) 1967.)

SICKLE CELLS The effect of microincision of sickled erythrocytes by a laser beam suggests that the cells may be subject to avulsion of their rigid cellular processes as a result of mechanical injury incurred in normal circulation. Such injured cells may undergo either

immediate hemolysis or transformation into spherocytes which are subject to erythrophagocytosis. (Jenson, W. N., and Bromberg, P. A.: *Microincision of Sickled Erythrocytes by a Laser Beam*, *Science* 155: 704 (Feb.) 1967.)

FIBRILLATION ACIDOSIS At normal temperatures the ventricular fibrillation threshold was highest in respiratory alkalosis and there was a marked tendency for the alkalotic heart to resume a synchronous beat. Persistent fibrillation was preceded by runs of extrasystoles or fibrillation with spontaneous defibrillation. In acidosis multiple extrasystoles were not as frequently noted and fibrillation could occur without such premonitory signs. The difference between the multiple extrasystole threshold increased with increased pH. The conclusion was that the mechanism of protection in alkalosis was the greater tendency of the induced ectopic rhythm to extinguish itself. (Dong, E., and others: *The Ventricular Fibrillation Threshold in Respiratory Acidosis and Alkalosis*, *Surgery* 61: 662 (April) 1967.)

ACIDOSIS Acid-base balance and arterial blood gases were studied in 23 children with cyanotic heart disease. In 40 per cent of the patients a metabolic acidosis was encountered. In all cases of Tetralogy of Fallot, metabolic acidosis was compensated by low P_{CO_2} . In 60 per cent of transpositions, the metabolic acidosis was uncompensated particularly in cases with intact ventricular septum. Respiratory acidosis was observed in only 1 instance of transposition of the pulmonary veins. Correction of the acidosis was accomplished with THAM. This buffer permeates easily through cell membranes since it is 30 per cent unionized. This quick intracellular buffering is the chief advantage of THAM over other buffers. THAM will re-establish contractility of the heart when metabolic acidosis had reduced responsiveness to catecholamines. A vicious cycle is interrupted: Circulatory failure—metabolic acidosis—intensification of circulatory failure. THAM was given to acidotic infants one to three days before surgery and the acid base status could thus be balanced. A single infusion accomplished correction of pH and buffer base for several days, since 72 hours

after infusion 20 per cent of the injected THAM is still present in the body. During cardiac surgery some of the patients became acidotic again, but compensation could be readily achieved by re-infusion of THAM. The drug can be given as fast as sodium bicarbonate since the main complication, respiratory depression, is of no significance during controlled respiration. As buffer base is not readily determined during operation, a simple dosage formula has been used empirically: ml. of 0.3 molar THAM = $100 \times (7.4 - \text{actual pH})/2 \times \text{kg. body weight}$. Several children (4 with transpositions and 3 with extreme tetralogies) were treated in this manner before, during and after operation. Six of them survived. Anti-acidosis therapy is of great value in operations for cyanotic congenital heart disease, especially in transpositions. (Schöber, J. G., Tympner, K. D., and Bühlmeier, K.: *Acid Base Balance in Congenital Cyanotic Heart Disease and its Significance in the Pre- and Postoperative Care*, *Klin. Wschr.* 45: 282 (March) 1967.)

ACID-BASE BALANCE Blood gas determinations were made in patients undergoing total cardiopulmonary bypass utilizing disc oxygenator and varying oxygenator may be considered a lung with alveolar ventilation represented by oxygen flow rates. It is not necessary to add carbon dioxide in an effort to prevent hypocapnia and alkalosis. (Haller, P.: *Influence of Oxygen Flow Rate on Arterial Oxygenation and Acid Base Balance During Cardiopulmonary Bypass with Use of a Disc Oxygenator*, *Circulation* 35 (Supp. 1) 199 (April) 1967.)

Respiration

CONTROL OF RESPIRATION Previous studies, done in anesthetized animals, suggested that all central chemoreceptive areas for CO_2 are located near the surface of the medulla oblongata. In the present study, these chemoreceptive areas were identified on the surface of the medulla by application of nicotine in decerebrate cats whose peripheral chemoreceptors had been denervated. Subsequent application of procaine to these areas caused hypoventilation and decreased ventila-