

SHOCK Cardiovascular measurements were obtained in 100 surgical patients in various types and stages of shock. In hemorrhagic shock, low cardiac output was associated with diminished central blood volume, diminished total blood volume, and low central venous pressure. Relatively normal cardiac output was observed in the group with hemorrhage plus trauma, and secondary sepsis. Circulatory response to volume loading was compared to that with stimulation by sympathomimetic amines. Marked hemodynamic improvement was observed in over half of the severely shocked patients after administration of plasma expanders, especially dextran-40. Only about one-fourth of these patients demonstrated the greatest response to sympathomimetic amines; usually isoproterenol was more effective than vasopressors. (Shoemaker, W. C., and Baker, R. J.: *Evaluation and Treatment of the Patient in Shock from Trauma*, *Surg. Clin. N. Amer.* 47: 3 (Feb.) 1967.)

BLOOD PRESSURE IN SHOCK Arterial pressure was considerably higher than the cuff pressure obtained by auscultation or palpation of the brachial artery in 18 patients with shock and high total peripheral vascular resistance. Pulse pressure was also greatly underestimated by indirect measurement. This discrepancy was not observed in 21 hypotensive patients with low or normal resistance. Infusion of vasoconstrictor drugs into the arm circulation of normal subjects reproduced the clinical situation of normal arterial pressure with absent Korotkoff sounds and diminished radial pulses. High vascular resistance in the upper extremity prevents the hemodynamic events which normally produce the Korotkoff sounds. Disappearance of peripheral pulses is probably the result of reduced stroke volume and increased arterial wall stiffness. (Cohn, J. N.: *Blood Pressure Measurement in Shock; Mechanism of Inaccuracy in Auscultatory and Palpatory Methods*, *J.A.M.A.* 199: 972 (March) 1967.)

SEPTIC SHOCK A series of young patients with well-defined diagnoses and refractory clinical shock were studied hemodynamically. When conventional methods of therapy failed to correct hemodynamic deficits, phen-

oxybenzamine was administered. The pattern of response suggested that this drug improved cardiac function directly and thereby improved tissue capillary perfusion. Three modes of action appear to be possible: (1) direct inotropic action on the myocardium; (2) vasodilating effect on the coronary vessels and myocardial microvasculature; and (3) relief of postcapillary pulmonary vasoconstriction with increased venous return to the left heart. (Anderson, R., and others: *Phenoxybenzamine in Septic Shock*, *Ann. Surg.* 165: 341 (March) 1967.)

TREATMENT OF SHOCK The authors analyzed the pharmacodynamic actions of isoproterenol and hydrocortisone as these agents affect the heart and peripheral circulation in circulatory distress. Isotonic or hypertonic (30 per cent) dextrose was used as a vehicle and to each 50 ml. 1 mg. of isoproterenol and 200 mg. of hydrocortisone were added. This mixture was given intravenously and within 20 minutes to 120 minutes a stable blood pressure, from 100-120 mm. of mercury was established in 49 to 60 patients so treated. In the patients responding to treatment, the blood pressure prior to therapy could not be obtained in 27, and in 15 patients pressor amines were becoming ineffective. In 6 patients while the blood pressure was maintained by pressor drugs the combination effected a resolution of peripheral cyanosis. This effect on peripheral circulation was noted in 95 per cent of the patients. While the majority of the patients had hypotension associated with circulatory and ventilatory collapse (25), there were a number of other groups treated, *i.e.*, intoxication (16), multiple trauma (8), sepsis (5), and a miscellaneous group (6). The institution of the drug combination was undertaken in most instances after the failure of conventional therapy with blood and plasma expander. Eighty per cent of these patients were also supported by artificial respiration with oxygen in concentrations of no less than 50 per cent. Observations on 12 typical cases are reported in detail. One patient required therapy for 6 days receiving 1,300 mg. of hydrocortisone and 5.2 mg. of isoproterenol. In 8 of 11 patients with acute pulmonary oedema, the oedema disappeared with the drug com-

bination. 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 deserves continued trial. (Poisvert, M., and others: *The Treatment of Shock and Circulatory Distress With a Combination of Isoproterenol 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. Norepinephrine 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

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