

by 34 per cent as measured by the heated thermocouple technique. This change in blood flow was not accompanied by any significant change in arterial blood pressure. The reduction results from a greatly increased resistance to flow that may be due to an abolition of sympathetic vasodilator tone and an unmasking of the vasoconstrictor action of epinephrine on the alpha receptors. After treatment with propranolol, hemorrhagic hypotension resulted in striking increases in the resistance to flow within the myocardium. This was in marked contrast to healthy dogs, in which myocardial blood flow was maintained between blood pressure levels of 120 and 40 mm. of mercury. It is suggested that the use of beta adrenergic receptor blocking drugs in clinical practice may result in a reduced myocardial irritation especially under conditions where the activity of sympathetic nerves is increased. (Parrott, J. R., and Grayson, J.: *Myocardial Vascular Reactivity After Beta-Adrenergic Blockade*, *Lancet* 1: 338 (Feb.) 1966.)

CORONARY BLOOD FLOW Coronary blood flow (CBF) utilizing radioactive ^{86}Rb was 80.3 ml./min./100 g. tissue in normals and 56.8 ml. min./100 g. tissue in patients with hypertensive heart disease. The results agreed well with those utilizing the nitrous oxide technique. CBF was found to equal about 6 per cent of cardiac output in normal patients. Advantages of the ^{86}Rb technique were: (a) avoidance of coronary sinus catheterization; (b) average flow of entire myocardial mass is obtained; and (c) independence from prolonged steady state conditions. The main drawback relates to the radioactivity of ^{86}Rb which limits the maximum number of determinations in any one patient to two. (Donato, L.: *Measurement of Coronary Blood Flow by External Counting with Radioactive Rubidium*, *Circulation* 33: 708 (May) 1966.)

CORONARY BLOOD FLOW Diethyl ether exhibited little or no depressant action on coronary circulation in dogs at a light or moderate depth of anesthesia. Cyclopropane reduced cardiac output and left coronary blood flow in slight or moderate degree depending on the concentration inhaled, while the mean

arterial pressure was relatively well maintained during anesthesia, mainly because of slight or moderate increase in total peripheral resistance. Halothane and methoxyflurane exerted a profound depressant effect on the cardiovascular system. The higher the concentrations at which these two drugs were administered, the greater was the observed reduction in mean arterial pressure, pulse amplitude, heart rate, left coronary blood flow, cardiac output, stroke volume and left ventricular work. Protracted recovery of circulatory parameters from the profound depression following cessation of anesthesia was observed quite frequently in methoxyflurane anesthesia in contrast with halothane anesthesia. Statistically highly significant positive correlations were observed between left coronary blood flow and left ventricular work with all anesthetics and at all concentrations inhaled, while the left coronary blood flow showed less significant correlations with mean arterial pressure and cardiac output. (Saito, T., and others: *Coronary Circulation During Inhalation Anesthesia in Dogs (Japanese)*, *Jap. J. Anesth.* 14: 815, 1965.)

ANGINA PECTORIS Iproveratril, a new coronary vasodilator was administered to a group of 30 aged patients (average age 80.4 years) suffering from angina pectoris. Its effect upon decreasing the number of nitroglycerin tablets required by each patient per week was compared to that of a placebo, using a double blind crossover technique. This vasodilator significantly decreased the number of nitroglycerin tablets required to relieve angina, with no appreciable changes in pulse rate, blood pressure or ECG. The actions of Iproveratril are similar to those of known beta-receptor blockers, however, it dilates the coronary bed at smaller doses than those required to obtain other sympathetic effects. (Neumann, M., and others: *Double Blind Evaluation of Orally Administered Iproveratril in Patients with Angina Pectoris*, *Amer. J. Med. Sci.* 251: 552 (May) 1966.)

CARDIAC RESUSCITATION The clinical and biochemical aspects of cardiac resuscitation were studied in 57 episodes of cardiac

arrest in 37 patients with heart disease of whom half had undergone cardiac surgery. Of the 13 patients who left the hospital, the majority were in cardiac arrest for 15 minutes or less and had only a single episode. No patients who were in advanced heart failure before cardiac arrest survived. A high proportion of patients were hypoxemic during and after the cardiac arrest despite artificial ventilation with pure oxygen. There was a wide variation in acid-base status during and after the cardiac arrest which in three cases was corrected satisfactorily by administering a dose of sodium bicarbonate, in milliequivalents, which was equal to the weight of the patient in kilograms multiplied by one-tenth of the duration of the cardiac arrest in minutes. The state of the central nervous system provided no guide to the degree of acid-base disturbance. Experience showed the value of continuing resuscitation for at least an hour when there were satisfactory signs of brain activity. Five main criteria were used to assess the status of the central nervous system: pupil size, blink reflex, respiratory pattern, degree of struggling, and state of muscle tone, especially in the jaw. (Cilston, A.: *Clinical and Biochemical Aspects of Cardiac Resuscitation*, *Lancet* 2: 1039 (Nov.) 1965.)

PHYSIOLOGIC SHUNT After the administration of 100 per cent oxygen, blood samples simultaneously drawn from the left atrium and the aorta of subjects who had undergone open-heart procedures were analyzed for P_{O_2} , P_{CO_2} and pH. Using a modification of the Thebesian veins to the physiologic shunt was found to be 0.12 to 0.43 per cent of the aortic flow. (Ravin, M. B., Epstein, R., and Mahm, J. R.: *Contribution of the Thebesian Veins to the Physiologic Shunt in Anesthetized Man*, *Bull. N. Y. Acad. Med.* 42: 328 (April) 1966.)

PULMONARY SHUNTING Eighteen anesthetized patients undergoing nonthoracic surgical procedures were mechanically hyper-ventilated with gas mixtures containing 40 or 99 per cent oxygen. When arterial carbon dioxide tension was increased toward normal levels by adding carbon dioxide to inspired gas

and then reduced with CO_2 free mixtures, arterial oxygen tension usually increased and decreased concomitantly. Similar changes in carbon dioxide levels were induced in 11 other patients in whom the effect on cardiac output was measured and the extent of the right-left pulmonary shunting was estimated. With initial hypo-capnia, shunting exceeded 8 per cent. When cardiac output was unchanged with increased carbon dioxide levels, the increase in arterial oxygen tension reflected decrease of shunting. With change in cardiac output, there was a similarly direct change in shunting, interacting with and at times overriding the apparent "direct" effect of carbon dioxide. In 4 patients, observations at inspired oxygen tensions of 40 per cent were followed by similar observations at 99 per cent. In each case a significant increase in shunting occurred with increase in inhaled oxygen tension without change in carbon dioxide levels or cardiac output. Blood flow through nonventilated alveoli decreases at approximately 1 hour. This is interpreted as a vasoconstrictor effect. (Michenfelder, J. D., Theye, R. A.: *CO_2 Levels and Pulmonary Shunting in Anesthetized Man*, *Fed. Proc.* 25: 253 (March) 1966.)

PULMONARY VASCULAR RESISTANCE

Pulmonary vascular resistance in ventilated and collapsed lungs was measured in cats. When a lung was collapsed by occluding the main stem bronchus, blood flow through the collapsed lung was reduced by 35 per cent. This was accompanied by a large increase in pulmonary vascular resistance. These changes occurred whether or not the lung was denervated indicating independence from nervous control. Hypoxia increased pulmonary vascular resistance in both ventilated and collapsed lungs. Catecholamines, 5-HT and histamine produced a similar but less marked increase. Alpha-adrenergic blocking agents markedly reduced the response to lesser extent. Lysergic acid diethylamide (LSD) and mepyramine blocked the response to 5-hydroxytryptamine and histamine, respectively, but had little effect on the response to hypoxia. These data indicate that a local release of catecholamines (norepinephrine pri-