

CORONARY GAS PERFUSION The beat of the isolated dog heart may be maintained for periods up to eight hours by perfusion of the coronary circulation with oxygen in the gaseous state. The electrocardiographic activity, in some cases, continued after cessation of visible ventricular contraction for periods up to four hours after the last visible beat. Perfusion of the heart *in situ* within the chest with oxygen has been accomplished with later reversion to blood and re-establishment of the normal circulation. The observations indicate that oxygen perfused in the gaseous state is utilized by the heart and that cardiac contraction may be maintained for prolonged periods when the heart is perfused with oxygen alone. (Sabiston, D. C., and others: *Maintenance of Heart Beat by Perfusion of Coronary Circulation with Gaseous Oxygen*, *Ann. Surgery* 150: 361 (Sept.) 1959.)

SHUNT DETECTION Hydrogen gas crosses the pulmonary membrane and dissolves in blood readily; therefore it appears immediately in high concentration in the left heart, and after a short time in the right heart, but at lower concentration. The classic hydrogen reference electrode principle has been applied and modified here to measure concentration of gaseous hydrogen instead of pH. Experiments in dogs and later in humans suspected of having ventricular or auricular septal defects were subjected to the method. A hydrogen sensing platinum black tipped electrode is placed in the right ventricle via venous catheter, and the subject takes one breath of hydrogen gas. Records show a high peak effect in a shorter than usual time for circulation to the right heart, indicating the presence of a left to right shunt. Further clinical applications of the method are in progress, and electrodes are being designed to measure several parameters simultaneously. (Clark, C. L., Jr., and Barger, L. M., Jr.: *Left to Right Shunt Detection by Intravascular Electrode with Hydrogen as an Indicator*, *Science* 130: 709 (Sept. 18) 1959.)

BLOOD TRANSFUSION After acute blood loss or acute hemolytic crises, (e.g., acute hemolytic anemia) blood needs to be replaced. The hemoglobin level is not the

deciding factor because hemodilution is not completed for 24 or 48 hours. In anemias for which specific therapy exists (pernicious, iron deficiency, etc.) blood transfusion is usually not necessary unless signs of incipient heart failure supervene. Packed cells are preferable for this complication so that the circulation will not be overloaded. Patients having chronic hemolytic anemias (Cooley's sickle cell, aplastic) display very few symptoms until the hemoglobin concentration falls below 7 or 6 grams per cent. If a patient is asymptomatic and stable at this level, transfusion to a higher level of hemoglobin will not make him more comfortable and is a waste of blood. (Smith, C. H., and others: *Use and Abuse of Iron Therapy and Transfusion. Transcription of a Panel Meeting on Therapeutics*, *Bull. New York Acad. Med.* 35: 511 (Aug.) 1959.)

BLOOD VOLUME The red cell volumes of two hundred and one men were measured with Cr⁵¹ tagged red cells. Plasma volume and whole blood volume were derived indirectly from venous hematocrits. Using regression equations expressing the relations of the volumes to body weight and height and to combinations of these measures, a chart was devised from which the expected red cell volume and plasma volume for a man of given height and weight could be found conveniently. In the group examined, age, elements of the somatotype and habits of physical activity were found to influence the variance of the data only slightly, after the effects of height and weight had been accounted for. (Wennesland, R., and others: *Red Cell, Plasma and Blood Volume in Healthy Men Measured by Radiochromium (Cr⁵¹) Cell Tagging and Hematocrit*, *J. Clin. Invest.* 38: 1065 (July) 1959.)

CARDIAC ARRHYTHMIAS In elderly patients, disturbances in cardiac rhythm are far more significant than in young subjects and may frequently be a manifestation of heart disease. A study of twenty elderly patients with cardiac arrhythmia revealed that all were suffering from some form of underlying heart disease, but none showed gross evidence of decompensation. Since, in elderly people, hypertensive and arteriosclerotic heart disease is

a common finding and atrial fibrillation is frequently observed, it is possible that ionic alterations occurring in the heart muscle during faulty energy conversion within the myocardium are sufficient to activate an ectopic focus. The rate of discharge from this ectopic focus will govern the type of arrhythmia that ensues. (Gelfand, M. L.: *Cardiac Arrhythmias in Elderly, Geriatrics*. 14: 483 (Aug.) 1959.)

VENTRICULAR FUNCTION The relation between left ventricular end-diastolic volume and stroke work in the intact dog at rest during exercise was studied utilizing a biplane cinefluorographic technique. A definite relationship exists between left ventricular end-diastolic volume and the work of the stroke immediately following, provided conditions are held reasonably constant. End-diastolic and end-systolic volumes regularly decrease with the onset of mild exercise in the same preparation. Stroke work usually increases during exercise. Pressure and kinetic work are usually under-estimated when calculated from mean values for pressure, volume and velocity instead of from integrated data. (Chapman, C. B., Baker, O., and Mitchell, J. H.: *Left Ventricular Function at Rest and During Exercise*, *J. Clin. Invest.* 38: 1202 (July) 1959.)

THYROTOXICOSIS Intravenous infusions of procaine were administered to 70 thyrotoxic patients during the preoperative period in order to reduce their acute nervousness; 5 ml. of a 0.5 per cent solution were infused on the first day, and 10 ml. daily from the second day on. Eight to twelve infusions were administered altogether prior to the operation and 1 to 2 after the operation had been performed. An improvement in the patients' general condition becomes manifest after 3 or 4 infusions: sleep is restored, headaches become less intense, tachycardia stops. The use of procaine reduced the preparation period before the operation to 10 or 12 days. (Mikulyak, V. G.: *Experiences in Preoperative Preparation of Thyrotoxic Patients*, *Vrach. Delo* 4: 418, 1957.)

HYPERTHYROIDISM The physiologic aberrations in hyperthyroidism uncomplicated by congestive failure was compared with the

abnormalities found in patients in whom hyperthyroidism and congested heart failure co-exist. In 14 patients without congestive failure the hemodynamic responses during exercise were qualitatively normal. In the patients who had been in congestive heart failure the absolute level of cardiac output was normal in 4 and was markedly elevated in 3. All had inadequate responses of cardiac output to exercise. Atrial fibrillation occurred only in patients in congestive failure or in those with antecedent heart disease. The peripheral circulatory load in thyrotoxicosis is hemodynamically similar to that of systemic arteriovenous fistulae. Congestive failure occurred in the presence of the circulatory load of thyrotoxicosis under the following conditions: when myocardial function was reduced by heart disease of other etiology; when thyrotoxicosis transiently caused an inadequate myocardial function; or when the circulatory load apparently overcame the reserve of the otherwise normal heart. (Gracttinger, J. S., and others: *Correlation of Clinical and Hemodynamic Studies in Patients with Hyperthyroidism With and Without Congestive Heart Failure*, *J. Clin. Invest.* 38: 1316 (Aug.) 1959.)

EFFICIENCY OF VENTILATION The efficiency of ventilation was studied in normal, emphysematous, and obese patients. In 7 normal subjects the efficiency of the chest wall and diaphragm was less than 7 per cent. The efficiency in 6 patients with emphysema was not greatly different at any particular work load, but this work load produced a smaller exchange of air. The 5 obese patients had values of efficiency which tended to be low. These low values were attributed to inordinately high energy costs required to move the adipose tissues overlying the chest and the abdominal walls. The possibility that the muscles were abnormal cannot be excluded, although there is no evidence to support this view. This extra energy expenditure presumably contributed to the dyspnea that was experienced by the obese patients on exercise. (Fritts, H. W. Jr., and others: *Efficiency of Ventilation During Voluntary Hyperpnea: Studies in Normal Subjects and in Dyspneic Patients With Either Chronic Pulmonary Emphysema or Obesity*, *J. Clin. Invest.* 38: 1339 (Aug.) 1959.)