

cardia, A-V dissociation and nodal rhythm; the incidence was only 20 per cent in patients over 18. By comparison, patients who had repairs of uncomplicated interventricular septal defects had an incidence of only 9 per cent arrhythmias (41 per cent in those with associated pulmonary hypertension), indicating the right ventriculotomy per se was not the primary causative factor. Precipitating factors fell into three categories: (1) acidoses and/or anoxia, (2) drugs (digitalis intoxication usually) and (3) operative trauma. Depending on the blood gas values, the management of acidosis involved assisted ventilation and/or intravenous administration of sodium bicarbonate. Digitalis intoxication enhanced by cardiopulmonary bypass occurred in 8 instances with one death; now digoxin is seldom given before the fourth postoperative day. Arrhythmias due to "operative trauma" usually followed atriotomy for closure of a large patent foramen ovale or atrial septal defect. (*Popper, R. W., and others: Arrhythmias After Cardiac Surgery. II Cyanotic Tetralogy of Fallot, With Comments in Regard to Ventricular Septal Defect, Amer. Heart J. 68: 32 (July) 1964.*)

CARDIAC ARRHYTHMIA In dogs anesthetized with chloroform, infusion of epinephrine caused bigeminy, irregular ventricular ectopic beats, or multifocal ventricular tachycardia. Vagal stimulation with resultant cardiac slowing could return sinus rhythm. Restoring the heart rate by driving the atria or stopping vagal stimulation reinduced arrhythmias. Heart rate is a factor in the production of ventricular ectopic activity in dogs during chloroform anesthesia. Although such activity occurs more readily when the A-V node and the upper bundle are intact, it can occur when that area is functionally disconnected from the ventricles. Ectopic foci or re-entry excitation might be the mechanisms responsible for this phenomenon. (*Vick, R. L.: Role of Heart Rate in Chloroform-Epinephrine Induced Cardiac Arrhythmia, Fed. Proc. 23: 326 (March-April) 1964.*)

ATRIAL FIBRILLATION Resistance of isolated rabbit atria to arrhythmic factors such as low potassium medium, acetylcholine, and

electrical stimulation was determined before and after contact with reserpine and following large doses of adrenaline. Animals pretreated with reserpine were more sensitive to arrhythmic factors than untreated controls. Adrenaline abolished the induced arrhythmias or lowered the frequency of atrial firing rate. This antiarrhythmic property of adrenaline at the atrial level is the result of an antagonism with acetylcholine, presumably through a lengthening of the duration of the action potential. (*Lavallee, M., Tremblay, G., and Beaulnes, A.: Effects of Reserpine and Adrenaline On Atrial Fibrillation, Canad. J. Physiol. 42: 385 (July) 1964.*)

VENTRICULAR FIBRILLATION Two cases are reported in which electroshock proved ineffective but in which procaine amide re-established sinus rhythm. Electroshock should remain the standard treatment of ventricular fibrillation but if it fails procaine amide may be useful. The recommended dose is 100 mg. intravenously with continuous electrocardiographic control. Administration should be continued until the fibrillation yields or heart block occurs. Series of electroshocks should be interposed between doses. (*Kristoffersen, M.: Electroshock-Resistant Ventricular Fibrillation Treated With Procaine Amide, Danish Med. Bull. 11: 127, 1964.*)

CARDIAC OUTPUT A new water-soluble organic dye of low toxicity, Coomassie blue, has been used in the indicator dilution method for the determination of blood volume and cardiac output. Mean plasma volume was determined to be 46.3 ml./kg., mean blood volume 77.4 ml./kg. and mean cardiac output 6.1 liters/minute. Effects of various anaesthetic agents on cardiac output was determined. Although previous investigations have suggested that the hypotension associated with halothane is due to a direct depressant effect of the drug on the heart, this study showed that, even in the presence of hypotension, the cardiac output is often raised, and it proved impossible to establish a direct relationship between the blood pressure and cardiac output. Only when the inspired concentration of halothane was raised well above that required for clinical anaesthesia for prolonged periods was there any

suggestion that the drug had a direct effect on the myocardium. Likewise during chloroform and cyclopropane anesthesia the cardiac output remained within normal limits. Only when a thiopentone-nitrous oxide-oxygen technique was used with intermittent thiopentone injections was there any tendency for the output to fall with time. In the maintenance of cardiac output the proper management of anaesthesia is more important than the agent used. (Payne, J. P.: *Use of a Dye Dilution Technique in Studies of Blood Volume and Cardiac Output During Anaesthesia and Surgery*, *Ann. Roy. Coll. Surg. Eng.* 34: 384 (June) 1964.)

PERIPHERAL RESISTANCE Sixteen dogs underwent total body perfusion with the use of the rotating disc oxygenator primed with cross-matched whole blood. Perfusion rate was based on direct measurement of basal cardiac output. Calculation of total peripheral vascular resistance before, during, and after the perfusion showed a slight decrease with the onset of perfusion under the above conditions. Metabolic studies suggested an adequate perfusion with no significant change in arteriovenous oxygen difference and an essentially normal hydrogen ion concentration. With pressure-controlled perfusion, peripheral vascular resistance rose during perfusion and metabolic studies showed the development of a progressive hypoxic acidosis. (Cordell, A. R., and others: *Peripheral Vascular Resistance in Whole Body Perfusion*, *J. Thor. Cardio. Surg.* 48: 94 (July) 1964.)

RENAL CIRCULATION Normal animals have a very constant perfusion of the kidneys which is slightly raised by increase in carbon dioxide and slightly decreased by hypoxia. After noradrenaline, perfusion is decreased while systemic pressure is increased. After adrenalin, perfusion and blood pressure are diminished. After vasopressin systemic pressure is increased, perfusion is increased in the cat and decreased in the dog. After hemorrhage, renal perfusion is decreased to 12 per cent of normal and after reinfusion of blood normal renal perfusion is not reached after 2 hours. In hemorrhagic shock no substance is capable of increasing renal perfusion. (Weber,

V.: *Effect of Vasoactive Substances on the Renal Cortex in Normal Animals and in Shock*, *Z. Kreislaufforsch* 53: 619 (June) 1964.)

NOREPINEPHRINE Following intravenous administration of varying doses of norepinephrine in dogs, measurements were made of left ventricular and aortic pressure, the tension-time index, and cardiac output. Mean aortic pressure and cardiac output increased significantly during the first 15 minutes of infusion, and thereafter progressively declined below control levels throughout the remainder of the infusion. When norepinephrine was discontinued, further reductions in cardiac output and pressure were observed. Magnitude of the changes was related to dosage. Left ventricular end-diastolic pressure remained normal throughout the period of the experiment. Hypotensive, low cardiac output state associated with prolonged norepinephrine infusion does not represent primary cardiac insufficiency, although morphologic evidence of myocardial damage is invariably present. (Vittands, I., Moss, A., and Schenk, E. A.: *Cardiovascular Effects of Prolonged Norepinephrine Infusion*, *Fed. Proc.* 23: 232 (March-April) 1964.)

EXTRACORPORAL CIRCULATION Changes in the coagulation mechanism are proportional to the duration of extracorporeal perfusion. Thrombocytopenia, hypofibrinogenemia, and hypofibrinogenemia of moderate degree occurred during short perfusions (1 hour), and were not associated with bleeding complications. During long perfusions (over 1 hour) there was increased fibrinolytic activity, circulating anticoagulants appeared, and abnormal bleeding occurred. Aminocaproic acid should be administered prophylactically during long perfusions. (Marin, H. M.: *Hemostatic Mechanism in Extracorporeal Circulation*, *Arch. Surg.* 88: 988 (June) 1964.)

RINGER'S LACTATE Cardiopulmonary bypass was performed in 18 patients with the disc oxygenator, primed with either 5 per cent glucose and water, Ringer's, or Ringer's lactate solution. The latter was the more physiologic perfusate in that the electrolytes were maintained within normal range and the lactate