

Extracorporeal Circulation, Proc. Roy. Soc. Med. 51: 579 (Aug.) 1958.)

OPEN HEART MORTALITY Seventy patients were operated upon for heart disease using the total cardiopulmonary bypass method. Thirty-nine were operated upon using the plastic screen oxygenator and thirty-one using the rotating disk operator. Lowering of mortality from these procedures is associated with improvement in team skill rather than improvement in mechanical design. The most satisfactory clinical course follows the perfusion that most nearly maintains hemostasis. (Gerbrode, F., and others: *Extracorporeal Circulation in Intracardiac Surgery, Lancet* 2: 284 (Aug. 9) 1958.)

HEART-LUNG DEVICES To avoid overfilling of the pulmonary vascular bed during use of a heart-lung machine three devices have been developed—(1) a precise automatic control of blood volume in the oxygenator to prevent forward overloadings of the lungs by changes in volume; (2) an open reservoir in the venous line to preclude the possibility of drawing the walls of the vena cavae into the openings of the cannulae; (3) a cannula in the left atrium (a) to monitor left atrial pressure, and (b) to permit release of blood from the left atrium to avoid buildup of pressure and retrograde overfilling of the pulmonary vascular bed. (Olmsted, F., Kolff, W. J., and Effler, P. B.: *Three Safety Devices for the Heart-Lung Machine, Cleveland Clinic Quart.* 25: 169 (July) 1958.)

RECORDING MONITOR An instrument for clinical use has been devised that displays several physiologic phenomena simultaneously and records them on magnetic tape. The recorded information can be reproduced any number of times and observed in the same manner as it was while it was being recorded. (Proudfit, W. L., and Dobosy, J. F.: *Magnetic Tape-recording Electro-physiologic Monitor, Cleveland Clinic Quart.* 25: 15 (July) 1958.)

TISSUE OXYGEN UPTAKE The effect of altering local external temperature on oxygen uptake of the tissues of the forearm was studied during reactive hyperemia in 23

healthy subjects. At both high and low forearm temperatures the mechanism of repaying an oxygen debt incurred in a period of arterial occlusion involved an increase in local circulation, with the factor of greater removal of oxygen from the blood playing a secondary role. Depression of the local tissue temperature of the forearm from an artificially elevated level definitely decreased the oxygen debt incurred in a period of arterial occlusion. Increased local temperature of tissues "in vivo" raises their oxygen uptake, while decreasing it has the opposite effect. (Abramson, D. I., and others: *Relationship Between a Range of Tissue Temperature and Local Oxygen Uptake in the Human Forearm. II. Changes Observed After Arterial Occlusion, in the Period of Reactive Hyperemia, J. Clin. Invest.* 37: 1039 (July) 1958.)

VENOUS PRESSURE Venous pressure-volume changes in response to hyperventilation were studied in 20 individuals. Forearm venous pressure decreased during hyperventilation with air and increased slightly during hyperventilation with carbon dioxide. Active venous constriction occurred during hyperventilation. There was no significant difference in this response while breathing air as compared to carbon dioxide. Blood shifted out of the forearm veins during hyperventilation with air. Peripheral venous constriction may serve to increase the availability of blood to the heart during hyperventilation. (Eckstein, J. W., Hamilton, W. K., and McCammond, J. M.: *Pressure-Volume Changes in the Forearm Veins of Man During Hyperventilation, J. Clin. Invest.* 37: 956 (July) 1958.)

PULMONARY ARTERY FLOW Instantaneous linear velocity of blood flow in the human pulmonary artery is measured by using an indwelling double lumen catheter, through which pressures are recorded by means of pressure transducers from the tip of one and a side fenestration of the other catheter 4 mm. distal to the tip. The pressure differences are related to a derived equation from which instantaneous velocity can be calculated. Pressure curve data are presented from two sites, (1) just distal to pulmonic valve and (2) in a branch of right pulmonary artery. Maximum

instantaneous velocities calculated were 29 cm./second at site (1) and 22 cm./second at site (2). Technically not difficult, this method provides a means to measure instantaneous velocity in any vessel with a significant rate of flow, and also a means of measuring volume flow per beat such as stroke volume in pulmonary artery. (Jameson, A. G.: *Instantaneous Linear Velocity of Flow in Pulmonary Artery Measured by Catheter Tip Method*, *Science* 128: 592 (Sept. 12) 1958.)

PULMONARY BLOOD FLOW "Effective" pulmonary collateral blood flow was measured in 12 human subjects with various types of pulmonary and cardiac abnormalities by special adaptations of the Fick principle. "Effective" collateral blood flow was demonstrated in a subject with long-standing ligation of a pulmonary artery and in other individuals with bronchiectasis, cystic disease of the lung, and idiopathic clubbing of the fingers. These blood flows, however, did not exceed 8 per cent of the total pulmonary blood flow. Subjects with atresia of the main pulmonary artery displayed large "effective" pulmonary collateral blood flows, which approximated normal values for cardiac output at rest. During exercise these flows either remained unchanged or increased. (Fishman, A. P., and others: *The "Effective" Pulmonary Collateral Blood Flow in Man*, *J. Clin. Invest.* 37: 1071 (July) 1958.)

PULMONARY HYPERTENSION Ten dogs were subjected to banding of right and left pulmonary veins. Nine dogs survived. In 5 of the 9 dogs there was a rise in pulmonary artery and pulmonary wedge pressures. In 7 dogs a pulmonary resection of 1 or 2 lobes of the right lung was done. Five to eight months after banding 4 dogs died of severe pulmonary edema. (Barnes, W. H., and others: *Experimental Production of Pulmonary Hypertension*, *Surgery* 44: 361 (Aug.) 1958.)

ENDOTRACHEAL PRESSURE The cardiac output in 16 of 19 anesthetized patients was significantly decreased when the mean endotracheal pressure was elevated. The dye dilution technique was the method em-

ployed in making serial determinations of cardiac output in anesthetized patients undergoing surgery. To minimize changes in cardiac output during operations with the thorax intact, the mean endotracheal pressure must be kept near atmospheric. This practically necessitates the use of a negative phase in the apparatus if adequate ventilation is to be accomplished. (Cathcart, R. T., and others: *Cardiac Output Under General Anesthesia, The Effect of Mean Endotracheal Pressure*, *Ann. Surg.* 148: 488 (Sept.) 1958.)

CARDIAC OUTPUT Under barbiturate anesthesia and with an open chest, cardiac output can be measured in dogs by means of an electromagnetic flowmeter. Cardiac output may be measured in the ascending aorta or in the descending aorta and aortic arch branches. In either event, coronary flow is not measured. Advantages are that the measurements can be made continuously and results are immediately available. (Schenk, W. G., and others: *The Electronic Measurement of Cardiac Output*, *Surgery* 44: 333 (Aug.) 1958.)

BLOOD PRESSURE Digital systolic and diastolic blood pressures in human subjects were estimated by means of an auscultatory technique similar to the clinical auscultatory method of measuring brachial blood pressure. Narrow occluding cuffs lead to higher pressure readings than wide cuffs. Because of the effect of temperature regulation reflexes on digital blood pressure such readings should not be taken to represent central blood pressure or indication of the direction of change in central blood pressure. (Gaskell, P., and Krisman, A. M.: *An Auscultatory Technique for Measuring the Digital Blood Pressure*, *Canad. J. Biochem. & Physiol.* 36: 883 (Sept.) 1958.)

CARDIAC METABOLISM Glucose is the primary substrate for carbohydrate metabolism in the isolated, perfused beating heart of the dog anesthetized with intravenous pentobarbital. The uptake of glucose or lactic acid was not correlated with arterial concentrations. The energy production of the heart beat arrested with potassium citrate solution is approximately 1/1000-1/2000 that of the isolated