

OXYGENATOR A capillary membrane oxygenator utilizing Silastic capillary tubing for gas exchange in a closed, constant volume blood pool was constructed. Fourteen cardiac bypass perfusions were carried out on sheep at flow rates of 55 to 60 ml./kg. Blood oxygen tensions were excellent and hemolysis minimal. A pulsatile blood flow through the oxygenator increased its efficiency. (*Bodell, B. R., and others: A Capillary Membrane Oxygenator, J. Thor. Cardio. Surg. 46: 639 (Nov.) 1963.*)

EXTRACORPOREAL CIRCULATION

The life-span of erythrocytes is reduced to half of normal in extracorporeal circulation by absorption of denatured plasma to the surface of the red blood cell. The denaturation occurs because there is no membrane between gas and plasma in the machine. Sludging of red blood cells is the consequence. (*Schmidt-Mende, N., Frey, K. W., and Sebenini, F.: Life-Span of Erythrocytes in the Heart-Lung Machine, Thoraxchirurgie 10: 685 (June) 1963.*)

BLOOD FOR BYPASS Several advantages accrue to the Blood Bank from using reconstituted bank ACD blood rather than fresh heparinized blood for priming pump-oxygenators. Stored acid-citrate-dextrose blood up to four days old was subsequently heparinized and recalcified in the pump oxygenator. A comparison was made with cases in which fresh heparinized blood was used. Some postoperative clotting abnormalities were encountered in an patients, but there was no significant difference between the two groups. No evidence was found of any serious disadvantage in the use of ACD blood. (*Britten, A., and others: Use of ACD Bank Blood and Fresh Heparinized Blood in Open-Heart Surgery, Transfusion 3: 368 (Sept.-Oct.) 1963.*)

ARRHYTHMIA Effects of lidocaine and procaine amide on arterial pressure, myocardial contractile force, and ventricular excitability in 12 patients undergoing cardiac operations showed an increase in the stimulation threshold of the ventricle during diastole and neither drug caused a significant change in duration of the absolute refractory period.

Lidocaine produced no significant circulatory depression but every patient given procaine amide evidenced a fall in arterial pressure and a decrease in the contractile force of the right ventricle. These physiologic observations and clinical experiences with the use of lidocaine indicate that it is an effective antiarrhythmic agent and that it is preferable to procaine amide in the management of ventricular arrhythmias that occur during and following cardiac operations. (*Harrison, D. C., and others: Antiarrhythmic Properties of Lidocaine and Procaine Amide, Circulation 28: 486 (Oct.) 1963.*)

CARDIAC ARRHYTHMIAS Effect of isoproterenol in producing abnormal cardiac rhythms has been investigated in dogs anesthetized by various anesthetics. Threshold doses of isoproterenol for induction of atrio-ventricular nodal rhythm by arterial injection into the left circumflex coronary artery did not differ in dogs anesthetized with cyclopropane, pentobarbital or ether. However, injections of isoproterenol or epinephrine into the anterior descending coronary artery did produce arrhythmia in dogs anesthetized with cyclopropane. Quinidine sensitized the atrio-ventricular node to induction of pacemaker activity following isoproterenol injection into the left circumflex artery. On the other hand, quinidine caused an increase in threshold for arrhythmias produced by isoproterenol injection into the anterior descending artery. (*Dresel, P. E., Hart, M. C., and Stromblad, B. C. R.: Cardiac Arrhythmias Induced by Injection of Isoproterenol into the Coronary Arteries, J. Pharmacol. Exp. Ther. 140: 67 (Apr.) 1963.*)

CUTANEOUS RESPIRATION A temperature of 22° C. and an oxygen pressure of 250 pounds/square inch permits optimal survival of fetuses in an incubator utilizing oxygen under pressure and fetuses with membrane and placenta intact bathed in an immersion solution. (*Goodlin, R. C.: Cutaneous Respiration in a Fetal Respirator, Amer. J. Obstet. Gynec. 86: 571 (July) 1963.*)

OXYGEN ERROR Apparently as a result of the Hamburger phenomenon, optical den-

sity of dog blood changes with changes in P_{CO_2} . Thus, a systematic error may be introduced when change in optical density is used to measure the oxygen content of the blood and when there is a simultaneous change in P_{CO_2} . (Solomon, P., and others: *Optical Density Changes in Dog Blood at Full Oxygen Saturation with Changes in P_{CO_2}* , *J. Appl. Physiol.* 81: 739 (July) 1963.)

HYPERBARIC OXYGEN Fourteen days' exposure to a total pressure of 258 mm. of mercury and P_{O_2} of 243 mm. of mercury in four men caused no atelectasis or hematologic disorders attributable to the oxygen-rich environment. Eye irritation, aural atelectasis, erythema of the posterior pharynx and substernal pain were the only symptoms encountered. (Morgan, T. E., and others: *Physiologic Effects of Exposure to Increased Oxygen Tension at 5 PSIA*, *Aerospace Med.* 34: 720 (Aug.) 1963.)

HYPERBARIC OXYGEN In addition to apparent advantages of increased body oxygen stores obtainable with pressurized oxygen, there are many problems which must be solved before it can be a safe and effective tool. The problem of oxygen toxicity in man breathing pressurized pure oxygen appears to be primarily the central nervous system effects (convulsions). This complication can be avoided largely by utilizing pressures under three atmospheres absolute for limited periods of time (in most cases less than an hour) although longer periods of time are tolerated well if hyperbaric oxygen is alternated with normal pressures for short intervals. Altered carbon dioxide transport and tissue acidosis probably play a part in toxicity but it would seem inactivation of certain enzymes in the tricarboxylic acid cycle, possibly through oxidation of sulfhydryl groups, is a more important factor. (Richards, V., Pinto, D., and Coombs, P.: *Considerations and Uses of Hyperbaric Oxygen Therapy in Surgery*, *Amer. J. Surg.* 106: 114 (Aug.) 1963.)

OXYGEN CONSUMPTION Effects of exposure to cold on the rate of oxygen consumption was studied in unanesthetized newborn guinea pigs and rabbits. Urethane anes-

thesia resulted in a small reduction in the metabolic response to cold. In anesthetized rabbits muscular paralysis caused by *d*-tubocurarine was accompanied by a decrease in oxygen consumption, a fall in blood pressure and a reduction in the pressor response to nicotine. Muscular paralysis caused by gallamine did not decrease oxygen consumption in a cold environment, provided there was no fall in blood pressure. In anesthetized newborn animals, a large part of the immediate increase in oxygen consumption on exposure to cold persisted in spite of muscular paralysis. The increase could have been due to secretion of large quantities of sympathetic amines. (Dawes, G. S., and Mestyan, G.: *Changes in Oxygen Consumption of Newborn Guinea pigs and Rabbits in Exposure to Cold*, *J. Physiol.* 168: 22 (Aug.) 1963.)

ASPHYXIA Immature animals of many species survive asphyxia or anoxia for longer time than do adults. If glycolysis is inhibited, the survival time is reduced to that of the adult. Fetal lambs of 74 to 92 days gestation were asphyxiated by tying the umbilical cord. When glucose was infused with sufficient base to check the fall in arterial pH, blood pressure and heart rate fell more slowly than in the untreated lambs, the rate of rise of plasma potassium was reduced by 60 per cent and the blood lactate continued to rise rapidly throughout the period of asphyxia. Infusion of glucose only or base only was ineffective. When base was infused alone, the total cardiac carbohydrate appeared to be depleted more rapidly than in the untreated lambs. When glucose was infused alone or in combination with sodium chloride, the terminal carbohydrate was no different from that in untreated lambs subjected to the same period of asphyxia. It was concluded that if glycolysis is maintained during asphyxia by checking the fall in arterial pH and providing glucose as a substrate, sufficient energy may be available to maintain both the circulation and the integrity of the tissues for longer than in untreated lambs. (Dases, G. S., and others: *Prolongation of Survival Time in Asphyxiated Immature Fetal Lambs*, *J. Physiol.* 168: 43 (Aug.) 1963.)