

to 6 to 14 minutes, but the breaking-point alveolar carbon dioxide tensions did not exceed those noted above. A decrease in lung volume occurred, which in 13 minutes was equal to the vital capacity. (Klocke, F. J., and Rahn, H.: *Breath Holding After Breathing of Oxygen*, *J. Appl. Physiol.* 14: 689 (Sept.) 1959.)

BREATH HOLDING When the breath is held the arterial PCO_2 rises rapidly as a result of decreased clearance of carbon dioxide from venous blood, the lung volume shrinkage, and the Haldane effect from oxygenation of hemoglobin. The venous PCO_2 rises more slowly because of the uptake of carbon dioxide by the tissues and the Haldane effect from reduction of oxyhemoglobin. By this mechanism the carbon dioxide output into the lungs progressively falls and eventually stops. The cycle then is reversed and the carbon dioxide moves from lungs to arterial blood. (Mithoefer, J. C.: *Mechanism of Pulmonary Gas Exchange and Carbon Dioxide Transport During Breath Holding*, *J. Appl. Physiol.* 14: 706 (Sept.) 1959.)

ARTIFICIAL RESPIRATION In the collapsed, nonbreathing victim, the direct mouth-to-mouth method is without doubt the most effective way to restore life. The mouth to oral airway or self-inflating bag with mask is the safest and most satisfactory method for those who have had limited instructions. Any other apparatus should be used only by those specially trained in resuscitation. (Dobkin, A.: *Save a Life with a Breath of Air*, *Canad. M. A. J.* 81: 458 (Sept. 15) 1959.)

ARTIFICIAL RESPIRATION Mouth-to-mouth respiration by laymen often fails to be effective because of the difficulty in maintaining a free airway and insuring a good enough seal. These deficiencies could be overcome by teaching the laymen to open his mouth more widely around the victim's mouth to insure a tight seal and to insist upon maximum hyperextension of the patient's head. This method was tested on more than 300 unconscious patients; there were only three in whom good artificial respiration could not be main-

tained. (Ruben, A., Elam, J. O., and Ruben, H.: *Rescue Breathing*, *Lancet* 2: 69 (Aug. 1) 1959.)

AIRWAY OBSTRUCTION Airway patency was studied in 80 anesthetized spontaneously breathing patients who received no muscle relaxants. With the neck flexed (chin towards chest) the airway was obstructed in all patients, both in the supine and prone positions. With extension at the atlanto-occipital joint (chin up) in the supine position, approximately 50 per cent of the patients had an open airway. The other 50 per cent required, in addition to extension of the neck, forward displacement of the mandible or the insertion of an oropharyngeal airway or both. Roentgenograms demonstrated that the tongue is pushed against the posterior pharyngeal wall when the neck is flexed and the mandible is not held forward. (Safar, P., Escarraga, L. A. and Chang, F.: *Upper Airway Obstruction in the Unconscious Patient*, *J. Appl. Physiol.* 14: 760 (Sept.) 1959.)

AIRWAY RESISTANCE Alveolar-arterial oxygen differences were determined in anesthetized, paralyzed man. Approximately 20 per cent of the determinations showed a difference greater than 20 mm. Hg. The arterial tension was increased an average of 10 mm. Hg when the expiratory pressure was increased from -5 to +5 mm. Hg. The insertion of a 3 mm. orifice expiratory resistance increased the arterial oxygen tension an average of 7 mm. Hg. (Frumin, M. J., and others: *Alveolar-arterial Oxygen Differences During Artificial Respiration in Man*, *J. Appl. Physiol.* 14: 694 (Sept.) 1959.)

TRACHEOTOMY DANGERS Five cases of fatal cardiovascular and respiratory collapse immediately after tracheotomy are presented. It is hypothesized these were due to rapid reversal of pre-existing respiratory acidosis. Patients having elective or semielective tracheotomies for relief of respiratory obstruction should be followed with frequent blood pressure recordings, and hypotension should be treated with Trendelenburg position and intravenous vasopressors. (Greene, N. M.: *Fatal*

Cardiovascular and Respiratory Failure Associated with Tracheotomy, New England J. Med. 261: 846 (Oct. 22) 1959.)

CARDIAC ARREST A patient with 10 per cent third degree burns suffered cardiac arrests upon intubation after receiving thio-barbiturate, succinyl choline, oxygen and nitrous oxide on both his fourth and sixth anesthetics. He was very frightened before both procedures. After the second arrest and resuscitation the operation was resumed, the patient recovering without sequelae. Resumption of the operation after resuscitation is recommended if the patient is young, in good condition and resuscitation has been prompt. (Finer, B. L., and Nylen, B. O.: *Double Cardiac Arrest with Survival, Brit. M. J.* 1: 624 (March 7) 1959.)

HEART BLOCK Ventricular contraction will occur and permit control of the heart rate with application of low voltage (0.5-4.0 volts) repetitive electric stimuli to the endocardium in dogs. No evidence of trauma to the endocardium resulted after several hours of stimulation. It has been shown that the ventricles remained susceptible to such electrical stimulation from the endocardial surface upon surgical production of heart block in dogs. Clinical applications are cited. (Furman, S., and Robinson, G.: *Stimulation of Ventricular Endocardial Surface in Control of Complete Heart Block, Ann. Surg.* 150: 841 (Nov.) 1959.)

CARDIAC OUTPUT The cardiac output in nineteen patients following intracardiac operation with extra-corporeal circulation was greater than 2.4 liters per minute per square meter of surface area, and the mixed venous oxygen saturation was above 60 per cent. There were no serious cardiovascular difficulties in the early postoperative period in any of these cases. The cardiac output in another series of fifteen patients showed a marked decrease after surgery, being under 2.0 liters per minute per square meter, with some as low as 0.9 liters per minute. The etiology of the low cardiac output was undetermined in over 50 per cent of the cases. It is significant to note that the actual cardiac output measurement or

the mixed venous oxygen content showed a decrease some hours before the low output was evident by clinical signs alone. (Boyd, A. A., and others: *Estimation of Cardiac Output Soon After Intracardiac Surgery with Cardiopulmonary Bypass, Ann. Surg.* 150: 613 (Oct.) 1959.)

POST BYPASS HEMORRHAGE Various extracorporeal techniques have significant effects on clotting mechanisms but with a routine and set technique clotting disorders should be minimized. Emphasis should be placed on proper pre-op blood work up including platelet count, bleeding and clotting times, and on post by-pass evaluation of proper heparin neutralization with adequate doses of protamine. Excess doses of protamine which can cause anti-coagulant effects must be avoided. Bleeding problems are seldom encountered after short periods of total by-pass (30-60) minutes, but increase in frequency after periods of 2 hours or more. (Perkins, H. A., Osborn, J. J., and Gerbode, F.: *Management of Abnormal Bleeding following Extracorporeal Circulation, Ann. Int. Med.* 51: 658 (Oct.) 1959.)

EDGLUGATE-MG This blood anticoagulant-preservative consists of a mixture of disodium ethylenediamine tetraacetic acid, glucose, sodium gluconate and magnesium chloride. It was developed to permit use during perfusion of blood which had been stored temporarily. At the end of the five day storage period there was increased plasma potassium content and depression of antihemophilic globulin, and Factor V levels. It was used in 81 perfusion cases for priming the extracorporeal apparatus. (Smith, W. W., and others: *Studies of Edglugate-Mg: A New Donor Blood Anticoagulant-Preservative Mixture for Extracorporeal Circulation, Thoracic & Cardiovasc. Surg.* 38: 573 (Nov.) 1959.)

BLOOD COAGULATION Fifteen patients were anesthetized to plane 2 of cyclopropane anesthesia, and 6 patients were likewise anesthetized and made hypercarbic by rebreathing. A battery of tests designed to detect changes in blood coagulation were performed preoperatively, during second plane anes-