Literature Briefs

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Literature Briefs were submitted by Drs. A. Boutros, D. R. Buechel, H. Cascorbi, R. B. Clark, M. I. Gold, J. Jacoby, L. M. Kitahata, W. Mannheimer, F. C. McPartland, D. H. Morrow, J. W. Pender, L. J. Saidman and A. D. Sessler.

Circulation

HALOTHANE ARRHYTHMIAS The effects of halothane upon several different types of myocardial fibers were studied to gain information about the cause of halothane-induced arrhythmias. Two per cent halothane had very little effect upon either rabbit atrial or sheep ventricular fibers except for a slight prolongation of repolarization time in the rabbit and decreased duration of action potential and shortening of the refractory period in the sheep. In contrast, the effects upon conduction tissue (sheep Purkinje fibers) were considerable, with one per cent halothane causing decreased overshoot and duration of the action potential and increase of the resting potential and conduction time. Halothane, especially in the presence of sympathomimetic amines, may produce arrhythmias because of decreased conduction velocity, shortening of the refractory period, and a pronounced disparity between the refractory periods of Purkinje and ventricular fibers. (*Hauswirth, O.: Effects of Halothane on Single Atrial, Ventricular, and Purkinje Fibers, Circ. Res. 24: 745 (May) 1969.*)

PULMONARY CIRCULATION The effects of breathing 10 per cent carbon dioxide upon the pulmonary circulation were studied in healthy eucapnic patients and convalescing hypercapnic patients. Control measurements in the eucapnic and hypercapnic groups, respectively, were: Pa_{CO_2} 38 and 55 mm Hg; mean pulmonary artery pressure (MPAP) 15 and 33 mm Hg; pulmonary vascular resistance (PVR) 1.2 and 4.8 mm Hg/l/min; Pa_{O_2} 77 and 46 mm Hg. Breathing 10 per cent CO_2 abolished hypoxemia in the hypercarbic patients and elevated MPAP and PVR in both groups. Reduction of hydrogen-ion concentration with sodium bicarbonate did not decrease MPAP. Breathing oxygen had little effect in either group. The evidence suggests the CO_2 acts on pulmonary arterioles and capillaries that are exposed to alveolar gases to increase the pulmonary vascular impedance. (*Kilburn, K. H.: Effects of Breathing 10 Per Cent Carbon Dioxide on the Pulmonary Circulation of Human Subjects, Circulation 39: 639 (May) 1969.*)

PULMONARY EMBOLI The respiratory response to localized embolization with thrombi and 42-μ glass beads was determined in closed-chest, self-respiring, anesthetized dogs. After each of 24 embolizations with thrombi, the average change in respiratory rate was −1 per cent. Following each of 14 embolizations with 42-μ glass beads, the average respiratory rate change was +9.4 per cent. The primary difference between thrombi and glass-bead embolizations was a progressive desaturation of arterial blood and a steady rise in arterial P_{CO_2} with glass-bead embolizations, whereas no such changes were noted following embolizations with thrombi. (*Daily, P. O., and Moulder, P. V.: Respiratory Response to Lobar Pulmonary Embolism in Dogs, Surgery 65: 958 (June) 1969.*)

PULMONARY EMBOLISM The natural rate of resolution of pulmonary embolism was defined in 15 patients. The patients studied exhibited definitive angiographic evidence of bilateral embolism and were treated with heparin and/or venous ligation. Sequential studies showed only minimal angiographic and hemodynamic signs of resolution at seven days. At

10 to 21 days post-embolization, pressures in the right heart had decreased to near-normal levels and there was unmistakable angiographic evidence of resolution. Complete reversals, with normal angiograms and hemodynamics, occurred in three patients at 14, 15 and 34 days. In other patients angiographic and hemodynamic abnormalities persisted for weeks. (*Dalen, J. E., and others: Resolution Rate of Acute Pulmonary Embolism in Man, New Engl. J. Med. 289: 1194 (May) 1969.*)

AIR EMBOLISM During a seven-year period, 2,002 neurosurgical procedures were performed with the patients in the sitting position. Forty episodes of air embolism were recognized in 32 of these patients, and all but one episode occurred during surgical operations on the posterior cranial fossa. In each of 18 patients, a catheter had been placed prior to operation in the right atrium (21 episodes) or superior vena cava (two episodes). In all of these, the diagnosis was confirmed by the aspiration of volumes of air varying from 2 to 400 ml. During eight of the episodes, volumes exceeding 10 ml of air were aspirated. This experience supports a recommendation for placement of a catheter in the right atrium prior to surgical procedures likely to be complicated by air embolism. (*Michenfelder, J. D., and others: Air Embolism during Neurosurgery. An Evaluation of Right-atrial Catheters for Diagnosis and Treatment, J.A.M.A. 208: 1353 (May) 1969.*)

PULMONARY EDEMA Transthoracic electrical impedance was measured by placing circular skin electrodes around the neck and abdomen and was found to be a practical method for detecting intrathoracic fluid accumulation. The field was uninfluenced by chest-wall movements, which is a problem when spot skin electrodes are used. (*Pomerantz, M., and others: Transthoracic Electrical Impedance for the Early Detection of Pulmonary Edema, Surgery 66: 260 (July) 1969.*)

ARRHYTHMIA Premature systoles occurred in 264 of 5,129 persons surveyed (5.1 per cent). They were ventricular in 70 per cent and supraventricular in 30 per cent. The incidence increased with age and was greater in men than in women. Ventricular premature systoles were correlated with coronary heart disease. Among persons more than 30 years of age, 158 per 1,000 (26/165) of those with ventricular premature systoles had manifest coronary heart disease, compared with 50 per 1,000 (173/3,459) without premature systoles. Supraventricular premature systoles are not associated with higher prevalence of coronary heart disease or increased risk of sudden death. The higher prevalence of coronary heart disease and the greater incidence of sudden death in persons with antecedent ventricular premature systoles are independent of several known coronary risk factors: blood pressure, serum cholesterol, weight, glucose tolerance, and smoking habits. (*Chiang, B. N., and others: Relationship of Premature Systoles to Coronary Heart Disease and Sudden Death in the Tecumseh Epidemiologic Study, Ann. Intern. Med. 70: 1159 (June) 1969.*)

ARRHYTHMIAS Electrocardiograms of 116 patients made at two-hour intervals during the first three days following abdominal or thoracic surgery were examined. Arrhythmias were found in 46 of 98 patients who otherwise had no postoperative complications. Of 17 patients *with* postoperative complications, 12 developed disturbances in cardiac rhythm. The average age of these patients was 69 years, and most (70 per cent) had had abnormal electrocardiograms preoperatively. The most common arrhythmia was atrial fibrillation, followed by ventricular and supraventricular extrasystoles. The following are listed as possible causes of the arrhythmias: increased cardiac work in the immediate postoperative phase, due to pain and restlessness, or due to shivering and associated increase in oxygen consumption; sudden shifts in the acid–base equilibrium, as well as sudden changes in partial pressures of O_2 and CO_2; hypokalemia, even in nondigitalized patients; arterial hypotension, which was found in 36 per cent of cases. The types and incidence of the arrhythmias suggest that digitalis intoxication may play a significant role in the etiology of rhythm disturbances. Routine digitalization of all patients in the older age group is not advisable. (*Lunkenheimer, P. P., and others:*