Literature Briefs

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Literature Briefs were submitted by Drs. L. Bachman, R. Clark, R. Dunbar, M. Gold, A. Sessler, and W. Stevens. Briefs appearing elsewhere in this issue are part of this column.

Anesthesia

AUTONOMIC BLOCK The relative influences of the sympathetic and parasympathetic nervous systems on the resting heart rate were studied in 12 young healthy male patients. Total sympathetic blockade by spinal anesthesia to a C8-T1 sensory level caused a 10 per cent decrease in heart rate and a 20 per cent decrease in mean arterial pressure. Atropine (0.04 mg/kg), given intravenously after the spinal anesthesia had been well established, caused the heart rate to increase 40 per cent and the blood pressure to increase 5 per cent above the prespinal values. These data indicate that both autonomic components influence the resting heart rate, with the parasympathetic influences predominating. (O'Rourke, G. W., and Greene, N. M.: Autonomic Blockade and the Resting Heart Rate in Men, Amer. Heart J. 80: 469 (Oct.) 1970.)

CELL PROTECTION BY ANESTHESIA Light anesthesia for 24 hours with either halothane or nitrous oxide significantly reduced the destruction of normal murine hematopoietic stem cells by arabinosyl cytosine, as judged by results using the spleen colony-forming unit assay. Neither anesthetic affected the extent of reduction of lymphoma colony-forming units by ara-C. Halothane, in combination with vinblastine, similarly protected normal hematopoietic cells but not lymphoma cells. Halothane alone had no significant effect on either normal or lymphoma colony-forming cells, whereas nitrous oxide by itself reduced lymphoma colony-forming cells to 9 per cent of the number found in control mice. Since protection of normal cells was seen with combinations of different anesthetics and different phase-specific chemotherapeutic agents, these results may indicate a general phenomenon whereby anesthetics decrease the selectivity of cytotoxic drugs by protecting normal cells against them. (Bruce, D. L., Lin, H. S., and Bruce, W. R.: Reduction of Colony Forming Cell Sensitivity to Arabinosyl Cytosine by Halothane Anesthesia, Cancer Res. 30: 1803 (June) 1970.)

Circulation

INTRAVENTRICAL GLUCAGON IN MAN The central and peripheral vascular hemodynamic effects of 2 or 5 mg intraventricular glucagon were studied in 29 patients who were either in the acute phase of myocardial infarction or had chronic rheumatic heart disease. The isotropic action of the drug was evident from an increase in cardiac output secondary to an increase in heart rate and stroke volume. Pulmonary arterial pressure and vascular resistance fell. Systemic vascular resistance fell a mean of 19 per cent from control values, while mean arterial pressure rose an average of 8 per cent. The authors postulate that the systemic effect is mediated via a central action of the drug. The hemodynamic effects were rapid in onset, reached a peak in the first 10 minutes, and dissipated within 30 minutes of injection. Glucagon had a prominent isotropic effect in the presence of myocardial infarction (cardiac output rose 42 per cent) but was less predictable in patients in whom output was limited by chronic rheumatic heart disease (mitral stenosis and aortic insufficiency). Occasionally, glucagon produced undesirable increases in left atrial pressure in patients with mitral stenosis. Blood sugar levels rarely exceeded
CORONARY SHOCK: RESPONSE TO CATECHOLAMINES  Hemodynamics and myocardial metabolism were studied in 18 patients in cardiogenic shock following acute myocardial infarction. Responses to l-norepinephrine were studied in seven patients and responses to isoproterenol in four. Cardiac indexes (CI) were found to be low, and mean arterial pressures ranged from 40 to 65 mm Hg, while systemic vascular resistance values varied. Coronary blood flow (CBF) was decreased in all but three patients. Myocardial oxygen consumption was normal or increased. Myocardial oxygen extraction was above 70 per cent and coronary sinus oxygen tension below 23 mm Hg in most patients. Detection of an abnormal oxygen pattern within a sample of mixed coronary venous blood indicates the severity of myocardial hypoxia. In 15 studies myocardial lactate production was demonstrated. In the remaining three, lactate extraction was below 10 per cent. Excess lactate was present in 12 patients. During infusion of l-norepinephrine (14–40 μg/min) CI increased insignificantly, while in all patients increased arterial pressures were associated with increases in CBF, averaging 28 per cent. Myocardial metabolism improved. Myocardial lactate production shifted to extraction in three patients, and extraction increased in three. During infusion of isoproterenol (2.0–3.0 μg/min) CIs increased uniformly, averaging 61 per cent. Arterial pressures remained unchanged, but diastolic arterial pressures fell. CBF increased in three patients, secondary to decreases in CVR. Myocardial lactate metabolism deteriorated uniformly. In the acute state of coronary shock the primary therapeutic concern should be directed toward the myocardium, not the periphery. Since forward and collateral flows through the severely diseased coronary bed depend mainly on perfusion pressure, l-norepinephrine appears to be superior to isoproterenol; phase-shift balloon pumping may be considered early when pharmacologic treatment is unsuccessful. (Mueller, H., Ayres, S. M., Gregory, J. J., et al.: Hemodynamics, Coronary Blood Flow, and Myocardial Metabolism in Coronary Shock; Response to L-Norepinephrine and Isoproterenol, J. Clin. Invest. 49: 1885 (Oct.) 1970.)

MYOCARDIAL BLOOD FLOW  Myocardial blood flow, measured by N₂,O clearance in five patients with chronic complete heart block at the idioventricular rate (mean = 37 min) and at two elevated rates (mean = 80 and 100/min) increased as heart rate increased. The myocardial arteriovenous O₂ content difference, i.e., O₂ extraction/100 ml coronary blood flow, did not change, although myocardial oxygen consumption increased. As the heart rate increases mean coronary perfusion pressure increases along with a decrease in coronary vascular resistance. (Hedworth-Whiteley, R. B., Haisley, E., and Abraham, A. S.: The Relationship between Myocardial Blood Flow and Bradycardia in Man, Circulation. Rev. 4: 301 (July) 1970.)

VENOUS PRESSURE  When the blood volumes of anesthetized dogs were reduced 7 and 25 per cent, cardiac outputs were reduced from 116 ml/kg/min to 69 and 50, and mean aortic pressures from 119 mm Hg to 104 and 78, respectively. Pressure in the right atrium decreased more than did pressure in the external iliac vein, so the pressure gradient be-