Literature Briefs

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Literature Briefs were submitted by Drs. R. B. Clark, R. Dunbar, P. Hallowell, M. B. Laver, and E. Louenstein. Briefs appearing elsewhere in this issue are part of this column.

Circulation

WHOLE-BLOOD PRIME VERSUS HEMODILUTION DURING EXTRACORPOREAL CIRCULATION A detailed study of patient metabolism was carried out during and after open-heart surgery using a whole-blood prime or a 1/4 dilution with 5 percent dextrose in 0.45 percent NaCl. The differences between the values for electrolytes, glucose, insulin, lactate, and pyruvate with the two primes were consistent with the difference between the primes and similar to the changes previously reported by these authors. Growth hormone levels did not increase significantly in the patients perfused with whole blood, but did in the hemodiluted group, suggesting less stress reaction in the whole-blood group. Blood requirements of the two groups were of interest. Patients perfused with whole blood needed more added volume during perfusion and received more than twice as much blood in the period before midnight of the operative day than patients perfused with the solution with the lower hematocrit. (Moffitt, E. A., and others: Myocardial Metabolism in Open-heart Surgery Using Whole Blood in the Pump Oxygenator, Mayo Clin Proc. 46: 333–338, 1971.)

INSULIN SECRETION AND LOW CARDIAC OUTPUT Prior to open-heart surgery, six patients were studied with insulin secretion tests and measurements of arterial blood levels of free fatty acids, blood gases, pyruvate, and lactate. These measurements were repeated postoperatively on days 1, 2, 5, 7, 14, and 28, and results were related to the clinical states of the patients. The insulin secretion test was based on the potency of tolbutamide, iv, in releasing preformed insulin from the beta cells of the pancreas. The insulin secretion test was normal in every patient preoperatively, and most of the other measurements were in the normal range. Postoperatively, the insulin secretion test correlated with the clinical state of the patient. The response to tolbutamide, iv, was depressed whenever cardiac output was low, and improved commensurate with increased cardiac efficiency. Arterial-blood free fatty acids, lactate, and pyruvate all increased in the immediate postoperative period. These values gradually returned to normal, the extent of change and the rapidity of recovery correlating with the patients’ clinical states. The reason for the depression of the ability to secrete insulin in the low-cardiac-output state is uncertain. Two possibilities are presented: 1) decreased splanchic blood flow which prevents an adequate stimulus from reaching the pancreas, and 2) increased catecholamines which suppress insulin. These studies suggest that an ischemic myocardium may be further deprived of glucose metabolism by a deficiency of insulin. It occurs at a time when levels of free fatty acids, which have been shown to correlate with the appearance of arrhythmias and disorders of conduction, are elevated. Establishment of therapeutic value of insulin in the low-cardiac-output state needs further clinical trials. (Majid, P. A., and others: Insulin Secretion after Open-heart Surgery with Particular Respect to Pathogenesis of Low Cardiac Output State, Brit. Heart J. 33: 6 (Jan.) 1971.)