POSTER III—METABOLISM AND REGULATION—RESPIRATION

A313

Title: PROGNOSTIC SIGNIFICANCE OF BLOOD GLUCOSE LEVELS DURING LIVER TRANSPLANTATION

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Introduction: Significant hyperglycemia following reperfusion of the graft liver is a consistent finding in patients undergoing orthotopic liver transplantation (OLT). The rapid rise in blood glucose level on reperfusion is apparently related to ischemic injury to the donor hepatocytes, which allows intracellular glucose to leak out of the cells. To determine if a relationship exists between the degree of reperfusion hyperglycemia and the functional recovery of the graft liver, intraoperative blood glucose levels in patients undergoing OLT were reviewed.

Methods: Ninety consecutive adult patients undergoing OLT were reviewed. Anesthesia was induced with ketamine or sodium pentothal and maintained with fentanyl, isoflurane, and pancuronium. The only source of exogenous glucose was that transfused in CPD-A blood, all crystalloid was glucose-free (Plasmalyte-A®, Travenol Inc., IL). Methylprednisolone (1 g) was given to all patients within 5 min of reperfusion. Transfusion requirements were documented for all patients. Arterial blood glucose levels were measured hourly, and more frequently during the anhepatic stage and immediately after reperfusion of the graft liver using glucose oxidase test (Yellow Springs, NY). Patients were divided into two groups according to the postoperative outcome of the graft liver: group 1 had relatively normal hepatic function, and group 2 had inadequate hepatic function as defined by retransplantation within 72 h. ANOVA of repeated measures was used for statistical analysis and p < 0.05 was considered statistically significant.

Results: Blood glucose levels during OLT are displayed in Fig. 1. Glucose levels were similar in both groups during the pre- and anhepatic stages. All patients showed an abrupt rise in blood glucose level at 5 min postreperfusion; at that time the blood glucose level of patients in group 2 (n=13) was higher than that of group 1 (n=77) but the difference was not statistically significant. Blood glucose levels of the patients in group 2, however, were persistently higher than in group 1 at 30, 90, and 180 min after reperfusion (p < 0.01). No statistical correlation was found between the amount of blood transfused during surgery and the blood glucose level in the two groups of patients.

Discussion: The initial abrupt rise in blood glucose level on reperfusion of the graft liver is thought to be due to release of glucose from the donor liver. Glucagon degradation occurs rapidly with the onset of hepatic ischemia. Glucose leaks out of the hepatocytes even during cold preservation as a consequence of altered cell membrane permeability. The marked glucose intolerance seen in patients with poor hepatic function appears to be related to reduced glucose uptake and glycogen synthesis by the transplanted liver. Our results suggest that persistent severe hyperglycemia following reperfusion is an early prognostic indicator of impaired function of the graft liver.

References:

Figure 1. BLOOD GLUCOSE LEVELS DURING LIVER TRANSPLANTATION

- Group 1 (n=77) Patients who had relatively normal liver function postoperatively.
- Group 2 (n=13) Patients with poor hepatic function who required retransplantation.

Values are mean ± SEM.
* p < 0.01 compared with baseline values.
† p < 0.01 compared with the corresponding values of Group 1 patients.