

Title: TOTAL BODY OXYGEN CONSUMPTION IS AN EARLY PREDICTOR OF HEPATIC FUNCTION FOLLOWING ORTHOTOPIC LIVER TRANSPLANTATION

Authors: H. Steltzer, M.D., M. Hiesmayr, M.D., W. Mauritz, M.D., E. Zadrobilek, M.D., P. Sporn, M.D.

Affiliation: Department of Anesthesia and General Intensive Care, University of Vienna, Vienna, Austria.

Introduction. The most serious complication following orthotopic liver transplantation (OLT) is primary non function (PRNF) of the grafted organ. This study was undertaken to test the hypothesis that PRNF can be detected by means of cardiopulmonary function parameters and derived calculated values such as oxygen consumption index (VO₂I) which are routinely monitored during surgery in our institution. Prediction of PRNF could enable early detection with consecutive management of complications.

Methods. The cardiorespiratory variables of 9 patients with PRNF (non-survivors) were compared with those of 9 surviving patients, selected according to nearest operation date in our chronological liver registry list. Arterial pressure and pulmonary arterial pressure were measured direct and continuously, cardiac output was determined using the thermodilution technique. Derived variables included cardiac index (CI) and total body oxygen consumption (VO₂). Measurements were taken under baseline conditions, i.e., steady state anesthesia before the onset of surgery (A), during hepatic dissection (B), after cross clamping (C), at the end of the anhepatic period (D), 10 minutes after revascularisation (E) and, finally, during biliary tract reconstruction (F). Statistical analysis: Three-way analysis of variance and Tukey's method for multiple comparisons. A p-value of less than 0.05 was considered statistically significant (**).

Results. There is no difference in overall hemodynamics between survivors and non-survivors. VO₂I was about the same in the pre-anhepatic and anhepatic stage. After revascularisation VO₂I showed either moderate increases (40%) or decreases (50%) in non-survivors as compared to pre-anhepatic measurements, whereas in survivors there was a distinct increase (102%), (Figure).

Discussion. The present study clearly demonstrates that a lack of enhanced oxygen consumption with revascularisation after OLT is an early indicator of poor graft function. More specific, if the increase in VO₂I is more than 60% of baseline measurements, the function of the transplanted liver will be certain but if the increase is less than 40% the probability of a graft failure will be about 90%. In contrast to Svensson et al. (1) we conclude that the

return of VO₂I to pre-removal levels is not sufficient enough to guarantee immediate and adequate graft function. The early finding of inadequate enhancement of VO₂ is now prompting us to intensify the search for medical or surgical complications.

References.

1) Svensson et al: Whole body oxygen consumption during liver transplantation. Transpl Proc 5:3818-19, 1987

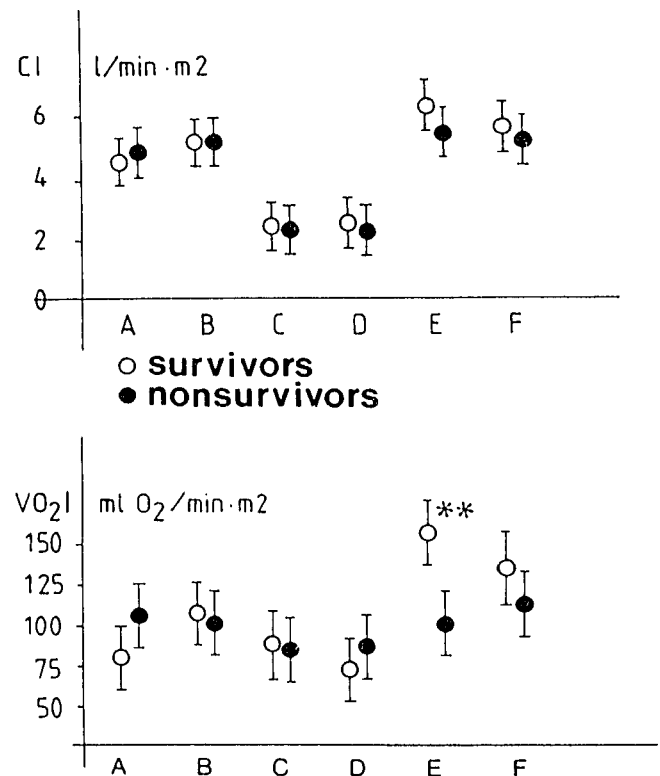


Figure. Absolute changes in oxygen consumption during orthotopic liver transplantation. VO₂I = oxygen consumption index, CI = cardiac index, survivors (n = 9), non-survivors (n = 9). ** p < 0.05.