ELSEVIER

Early Mortality in Liver Transplantation: Bilirubin as Predictor of Outcome

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ABSTRACT

The shortage of donor organs and the long waiting lists have increased the need to better select liver transplant candidates using predictors of success. We reviewed the results of 29 liver transplantations performed from January 2002 to February 2003 analyzing the correlations with early mortality (30 days) of patient data, pretransplant laboratory data, warm ischemia time, intraoperations blood unit transfusions, and postoperative complications of prolonged mechanical ventilation, dialysis, and infection. Overall early mortality was 27.6% and 44% in fulminant hepatic failure ($n = 9$), there were four retransplants with one death, and two intraoperative deaths. Only pretransplant bilirubin ($P = .045$) and postoperative lactate levels ($P = .002$) were significantly different between alive versus dead patients. In this small population bilirubin was more related to death than the MELD score. Lactate levels, nonspecific predictor of death in shock syndromes were probably related to septic complications.

THE SCARCITY OF DONOR organs has created a disparity between the supply and demand in liver transplantation, increasing the waiting time and waiting list mortality.[1] In Brazil, where organ distribution is based on the time patients have been on the waiting list (disregarding the severity of illness), there is an ongoing debate on the best way to allocate donor organs. Those physicians against a severity index criteria claim that limited resources will be directed to sick patients with worse survival outcomes.[2] It is necessary to better understand the factors that influence patient survival to develop a model that balances disease severity with better outcomes. Liver transplant data were analyzed to find prognostic markers taking into consideration patient characteristics, intraoperative data, and postoperative complications.

PATIENTS AND METHODS

The demographic data of 29 adult patients who underwent orthotopic liver transplantation from January 2002 to February 2003, were reviewed together with 11 pretransplant variables: bilirubin, INR, albumin, creatinine, sodium, potassium, urea, hemoglobin, WBC, platelets, and the Model for End-Stage Liver Disease (MELD) scores. In addition to two operative variables, namely warm ischemia and units of blood transfused during surgery seven postoperative variables were assessed; lactate (maximum value), prolonged mechanical ventilation (>24 hours); dialysis, bacteremia, fungal and viral infection, and gastrointestinal bleeding. Individual parameters were compared in survivors versus nonsurvivors after 30 days from liver transplantation using Student t test and the chi-square test with a significance level of $P < .05$.

RESULTS

Among the 29 transplanted patients 17 were men (58%), with an overall group mean age of 45.6 years (ranging from 23 to 68 years). Eleven patients had a Child Pugh score of C (38%); nine, B (31%); and nine, fulminant hepatic failure. Previous diagnoses were hepatitis C ($n = 8$), hepatitis B ($n = 6$), alcoholic cirrhosis ($n = 7$), primary biliary cirrhosis ($n = 4$), autoimmune hepatitis ($n = 3$), cryptogenic cirrhosis ($n = 2$), and other liver diseases ($n = 5$). The overall early mortality (during 30 days of follow-up) was 27.6% ($n = 8$). Mortality among patients with fulminant hepatic failure, ($n = 9$) was 44%. There was one death among four retransplants and three intraoperative deaths.

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Table 1. Comparison Between Survivors and Nonsurvivors 30 Days After Liver Transplantation

Variable	Survivors (n = 21)	Nonsurvivors (n = 8)	P
Age > 60	4	1	NS
Bilirubin (mg/dL)	12.5 ± 2.6	25.4 ± 7.3	.045
INR	3.0 ± 0.54	4.16 ± 1.21	NS
Creatinine (mg/dL)	1.26 ± 0.18	1.35 ± 0.30	NS
MELD	24 ± 2	31 ± 5	NS
Albumin (g/dL)	3.13 ± 0.3	2.75 ± 0.13	NS
Warm ischemia (minutes)	480 ± 43	580 ± 73	NS
Lactate (mg/dL)	36 ± 4	108 ± 30	.0002
Dialysis	3	1	NS
>24 hours mechanical ventilation	9	3	NS

Results are expressed as median ± standard error.

Comparison between survivors and nonsurvivors after 30 days showed only two parameters that significantly correlated with mortality: pretransplant bilirubin level and postoperative lactate (Table 1). Neither specific diagnoses nor bacterial, fungal, or viral infections were related to poor outcome.

DISCUSSION

In our single transplant center experience, bilirubin was the only pretransplant variable that was significantly related to early death. We had a small population with very severe disease (mean MELD score = 24.9), so we cannot extrapolate this data for further considerations. The MELD score was not related to early death in our patients. Although it is widely accepted as an index of liver disease severity with a good correlation to survival without liver transplantation.[3] However, although it has also been proposed as a predictor of mortality after transplantation,[4] this has not yet been confirmed.[5] A model including variables in the donor and during surgery has been proposed,[2] seeking to look beyond the basal status of the recipients. In our data the only postoperative variable related to death was lactate, which is a nonspecific marker of circulatory failure, and mortality in shock syndromes and septic complications. This observation suggests that previous liver function and graft function are important determinants of septic complications and mortality in liver transplants. Failure of other organs or infections are probably secondary determinants of survival.

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