



Acute Liver Failure—25 Years at a Single Center: Role of Liver Transplantation in the Survival of Adult Patients

E.C. de Ataíde*, S. Reges Perales, L. Bastos Eloy da Costa, F.G. Valerini, E. Shiyoyi Hirano, F. Chueiri Neto, R. Silveira Bello Stucchi, and I. de Fátima Santana Ferreira Boin

Unit of Liver Transplantation, University of Campinas, São Paulo, Brazil

ABSTRACT

Background. Acute liver failure (ALF) leads to high morbidity and mortality and is characterized by an accelerated deterioration of hepatic function in patients without prior liver disease. The survival rate is <15% without liver transplantation (LT). The aim of this study was to describe the population of patients with ALF in the Unit of Liver Transplantation of the University of Campinas, Brazil, from 1991 to 2017, comparing those submitted and not submitted to LT.

Methods. The patients were divided into 2 groups: 1, listed but not transplanted; and 2, transplanted.

Results. There were 73 patients with ALF listed for LT, with a mean age of 33.6 years, 49 (67.1%) female and 24 (32.9%) male. Group 1, with 32 patients, had a mean age of 29.3 years; 26 (81.25%) died on the waiting list; 6 (8.45%), with a mean age of 12.33 years, were removed from the list because of recovery of liver function. Considering only adult patients, the mortality without LT was 96.29%. Group 2 had 41 patients, with a mean age of 37.1 years, and a 30-day survival of 41.02%. Thus, LT led to a significant improvement in the survival of adult patients with ALF. The time of surgery, packed red blood cells, and intraoperative plasma, were associated with LT survival after logistic regression study, whereas age, body mass index, bilirubin, international normalized ratio, creatinine, sodium, and Model for End-Stage Liver Disease score were not.

Conclusions. ALF affects an active age range, and LT decreases mortality; there was no good preoperative prognostic indicator to assess which patients would benefit from transplantation.

ACUTE LIVER FAILURE (ALF) is a rare condition in patients without prior liver disease, characterized by accelerated hepatic dysfunction associated with neurologic dysfunction, coagulopathy [1], and massive hepatic necrosis in pathology evaluation [2]. It more frequently affects young individuals and leads to high morbidity and mortality. Liver transplantation (LT) is an emergency, with a crucial role in the implementation of survival [1].

The aim of the present study was to describe the population of patients with a diagnosis of ALF and indication of LT at the Unit of Liver Transplantation of the University of Campinas, from 1991 to 2017, to describe and compare the variables among the groups of patients listed but not transplanted and those who were transplanted, to verify the

role of LT in the survival of adult patients with ALF and identify factors associated with survival.

METHODS

This was a transversal retrospective study of patients with a diagnosis of ALF, included on a list for LT, at the Unit of Liver Transplantation

*Address correspondence to Elaine Cristina de Ataíde, Professor Doctor, Unit of Liver Transplantation, State University of Campinas, 241 Manacas Street, Residencial Manacas, Paulínia, São Paulo, Brazil, ZIP code: 13140-000. E-mail: elainebataide@yahoo.com.br

Table 1. Summary of Data

Variable	Group 1 (No LT) (n = 32)	Group 2 (LT) (n = 41)	Total (n = 73)	P Value
Age (y)	29.3 ± 18.0	37.1 ± 17.5	33.6 ± 18.1	.0553*
Sex				
Female	18 (56.3%)	31 (75.6%)	49 (67.1%)	.0806 [†]
Male	14 (43.8%)	10 (24.4%)	24 (32.9%)	
Weight (kg)	60.2 ± 21.1	66.3 ± 16.9	63.6 ± 19.0	.5886*
BMI (kg/m ²)	24.5 ± 9.5	24.7 ± 5.1	24.6 ± 7.4	.7331*
BI	17.3 ± 10.7	22.0 ± 9.7	20.6 ± 10.1	.2805*
INR	5.9 ± 4.2	4.7 ± 2.4	5.0 ± 3.0	.5801*
CR	2.8 ± 2.2	1.3 ± 1.0	1.7 ± 1.5	.0413* [‡]
Na	139.9 ± 5.4	138.0 ± 6.5	138.6 ± 6.2	.3410*
MELD	43.3 ± 21.2	38.4 ± 13.6	39.8 ± 16.1	.2590*
Death				
No	6 (18.8%)	11 (26.8%)	17 (23.3%)	.4177 [†]
Yes	26 (81.3%)	30 (73.2%)	56 (76.7%)	
BT				
A	5 (15.6%)	15 (36.6%)	20 (27.4%)	.0469* ^{‡,§}
AB	4 (12.5%)	2 (4.9%)	6 (8.2%)	
B	2 (6.3%)	7 (17.1%)	9 (12.3%)	
0	21 (65.6%)	17 (41.5%)	38 (52.1%)	
Time to event (d)	Death: 5.19	LT: 3.28		
Mortality in adults	92.29%	58.98%		
Recovery of liver function	1 adult, 5 children	–		

Abbreviations: LT, liver transplantation; BMI, body mass index; BI: bilirubin; INR, international normalized ratio; CR, creatinine; Na, serum sodium; MELD, Model for End-Stage Liver Disease score; BT, blood type.

*Mann-Whitney test.

[†]Chi-square test.

[‡]Fisher exact test.

[§]P < .05.

of the University of Campinas, São Paulo, Brazil, from 1991 to 2017. Patients were divided into 2 groups: 1, listed but not transplanted; and 2, transplanted. The following variables were evaluated: age, sex, waiting time on the list until transplantation or death, and survival at 30 days. After data collection, descriptive analysis was performed with the use of frequency tables. For comparison of proportions, the chi-square test or Fisher exact test was used, and for numeric measurements between 2 groups the Mann-Whitney test was used. Cox regression analysis and univariate and multiple models with stepwise criteria of variable selection were used to evaluate the factors related to survival. The level of significance was 5%.

RESULTS

There were 73 patients with ALF diagnosis listed for transplantation. The mean age was 33.6 years (range, 3–76), 49 (67.1%) were female, and 24 (32.9%) were male.

Group 1 had 32 patients with a mean age of 29.3 years. Of these, 26 died while on the waiting list for transplantation (81.25%) and 6 (8.45%) left the waiting list owing to recovery of liver function. The mean time between diagnosis and death was 5.19 days. They presented mean Model for End-Stage Liver Disease (MELD) score of 43.3.

Group 2 had 41 patients with a mean age of 37.1 years. Of these, 30 died and 11 survived, with a 30-day survival of 41.02% after liver transplantation. The mean time between

Table 2. Descriptive Analysis and Comparisons Between Death or Not in the Nontransplanted Group (Group 1)

Variable	Death No (n = 6)	Death Yes (n = 26)	Total (n = 32)	P Value
Age (y)	12.3 ± 5.4	33.2 ± 17.7	29.3 ± 18.0	.0055* ^{‡,§}
Weight (kg)	39.5 ± 20.8	65.0 ± 18.5	60.2 ± 21.1	.0197* ^{‡,§}
BMI (kg/m ²)	26.8 ± 21.1	23.9 ± 4.5	24.5 ± 9.5	.0865*
BI	6.8 ± 8.5	20.8 ± 9.2	17.3 ± 10.7	.0338*
INR	3.0 ± 2.7	6.9 ± 4.3	5.9 ± 4.2	.0787*
CR	2.6 ± 1.2	2.8 ± 2.5	2.8 ± 2.2	.7618*
Na	140.0 ± 1.4	139.8 ± 6.2	139.9 ± 5.4	.8039*
MELD	23.0 ± 12.4	49.5 ± 19.5	43.3 ± 21.2	.0198* ^{‡,§}
Sex				
Female	2 (33.3%)	16 (61.5%)	18 (56.3%)	.3649 [‡]
Male	4 (66.7%)	10 (38.5%)	14 (43.8%)	
BT				
A	2 (33.3%)	3 (11.5%)	5 (15.6%)	.4738 [‡]
AB	1 (16.7%)	3 (11.5%)	4 (12.5%)	
B	0 (0.0%)	2 (7.7%)	2 (6.3%)	
0	3 (50.0%)	18 (69.2%)	21 (65.6%)	

Abbreviations: as in Table 1.

[†]Chi-square test.

*Mann-Whitney test.

[‡]Fisher exact test.

[§]P < .05.

diagnosis and transplantation was 3.28 days. They had a mean MELD score of 39.8.

Among the variables analyzed, mean creatinine was 2.8 in group 1 and 1.3 in group 2 (P = .0413), and there was no statistical difference in the other variables. Table 1 presents the comparison between patients not transplanted and transplanted.

A descriptive and comparative analysis was performed to evaluate factors related to death in group 1 and is summarized in Table 2. In this group, the mean age of patients recovering liver function was 12.3 ± 5.4 years and of those who died was 33.2 ± 17.7 years (P = .0055).

Among the patients who showed hepatic function improvement, the mean age was 12.3 years, and only 1 adult had recovery of liver function. Mortality after 30 days among nontransplanted and transplanted adult patients was 58.98% and 96.29%, respectively.

The level of bilirubin and the MELD score were different between patients who recovered liver function and those who died: respectively, 20.8 mg/dL versus 6.8 mg/dL (P = .0338), and 49.5 versus 23 (P = .0198). The variables of surgery time and number of transfused red blood cells were significantly different: respectively, 7.5 hours versus 5.1 hours (P = .0039), and 7.8 units vs 4.6 units (P = .0240). The other variables evaluated were not statistically significant.

A logistic regression analysis was performed to study factors associated with survival in the transplant patients group and is presented in Table 4. In the univariate analysis, the variables surgery time, number of packed red blood cells, and transfusion of fresh frozen plasma were associated with higher mortality in this group: respectively, 19.5% for each hour of surgery, 17% for each unit of transfused concentrated red cells, and 4.8% for each fresh plasma unit.

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