



Characteristics of Liver Transplantation in Argentina: A Multicenter Study

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ABSTRACT

Introduction. There is a lack of information regarding outcomes after liver transplant in Latin America.

Objectives. This study sought to describe outcomes after liver transplant in adult patients from Argentina.

Methods. We performed an ambispective cohort study of adult patients transplanted between June 2010 and October 2012 in 6 centers from Argentina. Only patients who survived after the first 48 hours postransplantation were included. Pretransplantation and postransplantation data were collected.

Results. A total of 200 patients were included in the study. Median age at time of transplant was 50 (interquartile range [IQR] 26 to 54) years. In total, 173 (86%) patients had cirrhosis, and the most frequent etiology in these patients was hepatitis C (32%). A total of 35 (17%) patients were transplanted with hepatocellular carcinoma. In patients with cirrhosis, the median Model for End-Stage Liver Disease (MELD) score at time of liver transplant was 25 (IQR 19 to 30). Median time on the waiting list for elective patients was 101 (IQR 27 to 295) days, and 3 (IQR 2 to 4) days for urgent patients. Almost 40% of the patients were readmitted during the first 6 months after liver transplant. Acute rejection occurred in 27% of the patients. Biliary and vascular complications were reported in 39 (19%) and 19 (9%) patients, respectively. Renal failure, diabetes, and dyslipidemia were present in 40 (26%), 87 (57%), and 77 (50%) at 2 years, respectively.

Conclusions. We believe the information contained in this article might be of value for reviewing current practices and developing local policies.

LIVER transplant (LT) is a well-established therapeutic practice in Argentina for patients with end-stage liver disease. In Argentina, the first LT was performed in 1988, and during past decades the annual number of LTs has increased steadily, placing Argentina at the top of Latin American LT rates [1]. This was possible due to the advances in surgical techniques, peritransplant intensive care, and immunosuppressive regimens, which resulted in significant improvements in short-term survival.

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Although there is continual worldwide improvement in patient survival, LT patients may experience serious complications that not only contribute to significant morbidity and mortality, but also represent an extremely high cost to the health care system. A clear example of these are post-LT infections, which are estimated to occur in more than 50% of the LT recipients, being one of the most frequent complications during the early postoperative period [2,3] and remaining the most common indication of hospital readmission [3]. New-onset diabetes mellitus (NODM) after LT is another well-known complication; it occurs in 2.5% to 25% [4] of LT recipients and in 40% to 60% of hepatitis C virus-infected LT recipients [5]. Chronic renal failure after LT, mainly related to calcineurin inhibitors (CNI) toxicity [6–8], continues to be a major complication, with an incidence that ranges from 20% to 80%. In Argentina, studies in patients on the waiting list and post-LT survival have been published [9–11], although very limited data exist for the post-LT period. Understanding post-LT complications might be useful to develop strategies to predict and prevent them, improving the quality of care and potentially reducing overall costs. The aim of this study was to describe the characteristics and outcomes of patients after LT in Argentina.

PATIENTS AND METHODS

We performed an ambispective multicenter cohort study of patients who underwent LT from June 2010 to October 2012 in the 6 LT centers from Argentina that performed the largest numbers of LT when the study took place.

Argentina has a single national waiting list. The *Instituto Nacional Central Único Coordinador de Ablación e Implante* (INCUCAI) is the national institute for organ allocation, and organ procurement is exclusively run by the state, with no private procurement agencies. Since Argentina adopted the Model for End-Stage Liver Disease (MELD) system in 2005 as allocation policy, all patients were grouped into 2 categories: emergency or elective. Emergency status is considered for patients with acute liver failure and for patients with primary graft failure or those with hepatic artery thrombosis during the first postoperative week. Elective patients are stratified according to the MELD score. A specific regulation includes 3 situations for MELD upgrading, which includes familial amyloidotic polyneuropathy (16 points), hepatopulmonary syndrome (20 points), and stage II hepatocellular carcinoma (HCC) (22 points); these regulations contemplate 1 additional point in MELD scores every 3 months on the waiting list. By 2010 there were more than 20 authorized LT centers in Argentina, which has a population of 40,117,096 [12]. The centers involved in the study were the Hospital Italiano de Buenos Aires, Hospital Universitario Fundación Favaloro, Sanatorio Allende de Córdoba, Hospital Universitario Austral, Hospital Alemán and Hospital General de Agudos Dr. Cosme Argerich.

Patients included in this study were older than 18 years and were transplanted using a cadaveric donor. Exclusion criteria included prior LT, combined transplant, and death during the first 48 hours after LT. Patients were followed up from the day of LT until death, retransplantation, or the end of the 2-year follow-up period.

Each center provided detailed information for the patients included in the study. Data collection was performed using an

electronic form. The information collected included: demographics (age/sex); date of enrollment on the waiting list; primary diagnosis of liver disease at listing; Child-Pugh and MELD scores at inclusion on the waitlist and at the day of transplantation; history of diabetes before LT; donor characteristics; immunosuppression received; laboratory determinations at months 1, 3, 6, 12 and 24 after LT; medical and surgical complications; all-cause hospital readmissions; and graft and patient survival. All data records were checked for missing values and inconsistencies; queries were sent to all participating institutions, and corrections were made at the data-coordinating center, namely Hospital Italiano in Buenos Aires.

The estimated glomerular filtration rate (GFR) was calculated at each time point with the Modified Diet in Renal Disease (MDRD) GFR [13]. The definition of pre-LT diabetes included a history of diabetes or use of insulin or oral hypoglycemic medications. The definition of new-onset diabetes after transplantation (NODAT) was based on International Consensus Guidelines on NODAT 2003, which recommended that the diagnosis of NODAT should be based on the American Diabetes Association (ADA) criteria for type 2 diabetes [14,15]. Dyslipidemia was defined using the National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP) III criteria [16]. Renal failure was defined as the presence of a GFR of <50 mL/min/1.73 m² using the MDRD equation. Liver allograft rejection was diagnosed by biopsy according to Banff criteria [17]. Patient management and immunosuppression regimens were determined in each center. The study was conducted according to the principles of the Declaration of Helsinki and the Guidelines for Good Clinical Practices ICH E6. The study protocol was approved by the ethics committees of the participating hospitals.

STATISTICAL ANALYSIS

Discrete variables are presented as absolute and relative frequencies (percentages). Continuous variables are shown as median and interquartile ranges (IQR: 25th percentile and 75th percentile). To estimate the cumulative incidence of death, we calculated the time from LT to the date of death. The cumulative incidence of death at 1 and 2 years is reported with its corresponding 95% confidence interval (95% CI). The STATA software (StataCorp, version 14.2) was used for data analysis.

RESULTS

Liver Transplant Centers

A total of 200 patients were enrolled in the study. The total number of transplanted patients per center was as follows: Hospital Italiano from Buenos Aires: 64 (32%), Hospital Universitario Fundación Favaloro: 36 (18%), Sanatorio Allende: 33 (17%), Hospital Universitario Austral: 32 (16%), Hospital Alemán 25 (12%), and Hospital Dr. Cosme Argerich 10 (5%).

Indications for Liver Transplant

Primary diagnoses at time of listing are shown in [Table 1](#). Overall, 173 (86%) patients had cirrhosis, of which hepatitis C and alcohol-related liver disease were the 2 most frequent etiologies. Acute liver failure and other indications for LT were registered in 10 (5%) and 17 (9%) patients,

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