Access to Grafts in a Liver Transplant Center: Does It Rely on the Severity of the Waiting List Population?

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ABSTRACT

Background. The number of transplants performed relies, partially, on recipients' variables on the waiting list. The goal of this study was to compare recipients from a high-volume liver center in Argentina with the rest of the country.

Methods. This study was a retrospective analysis of liver transplant recipients nationally between January 2013 and April 2017. It involved extracting data from the open database CRESI-SINTRA (the Argentinian database of the National Procurement Organization, an equivalent to the United Network for Organ Sharing); expressing results by percentages, medians, and interquartile ranges (IQRs); and comparing the national population with the population transplanted at Hospital El Cruce (HEC). The Mann-Whitney U test was used for analysis.

Results. Nationally, 1434 liver transplants were performed. A total of 177 (12.34%) were emergency status; 811 (56.6%) were by the Model for End-Stage Liver Disease (MELD) (n 759)/PELD (Pediatric End-Stage Liver Disease) (n 52), with a median graft assignment position of 5 (IQR, 3e10) in 57.2 days (IQR, 11e217). Median MELD access

was 29 points (IQR, 24e33). A total of 446 (31.1%) had MELD exceptions; 249 (55.8%)

of these were due to Milan hepatocellular carcinoma. At the HEC, 167 liver transplantations were performed; 26 (15.6%) were emergency status and 97 (58.1%) by

MELD (none PELD). Their median graft assignment position was 4 (IQR, 4e16) in 19.1 days (IQR, 4e90); median MELD access was 28 points (IQR, 24e31). Forty-five patients (26.9%) had MELD exceptions; 31 (68.9%) were due to hepatocellular carcinoma.

Conclusions. Our center has a larger proportion of recipients transplanted by emergency status and MELD, similar MELD access, and less waiting list time, reflecting our wide policy of liver graft acceptance.

THE NUMBER of transplantations performed depends on the availability of grafts, the transplant center's willingness to take risks by maximizing the use of those grafts, and the variables of the population on the waiting list. After the introduction of the Model for End-Stage Liver Disease (MELD) system in Argentina in 2005 to allocate liver grafts, waiting list mortality has decreased; neverthe- less, the waiting list population increased by 70.4% (data analyzed 5 years after changing the distribution model, in 2010) [1]. Lack of access and inadequate health care coverage are still considered the main barriers for the development of liver transplantation in Latin America [2]. Despite a lack of donors, a new public liver center, Hospital

El Cruce (HEC), began activity in 2013 and rapidly became the leading transplant center in Argentina. One reason for this growth may be our wide acceptance of liver grafts, but the severity of the patients on our waiting list (HEC is the largest acute liver failure/acute liver injury series in Argentina) [3] may also have an influence.

Table 1. Descriptive Analysis of Liver Transplant Recipients Between January 2013 and April 2017

Variable	Argentina (n ¼ 1434)	HEC (n ¼ 167)
Emergency category	177	26
MELD/PELD category	811, MELD(759)/ PELD (52)	MELD (97)/ PELD (0)
MELD points to access graft	29 (24e33)	28 (24e31)
Delay, days	57.2 (IQR, 11e217)	19.1 (IQR, 4e90)
Graft assignment position	5 (IQR, 3e10)	4 (IQR, 4e16)
MELD exceptions category	446	45
Delay, days	209 (IQR, 78e393)	262 (IQR, 72e376)
Graft assignment position	9 (IQR, 5e19)	14.5 (IQR, 8e29)

Abbreviations: HEC, Hospital El Cruce; IQR, interquartile range; MELD, Model for End-Stage Liver Disease; PELD, Pediatric End-Stage Liver Disease.

The main objective of the present study was to evaluate patients' variables on liver transplant waiting lists from the past 5 years, with a focus on our population.

PATIENTS AND METHODS

This study was a retrospective analysis of liver transplant recipients in our country between January 2013 and April 2017. Data extracted from the open database CRESI-SINTRA (the Argenti- nian database of the National Procurement Organization, an equivalent to the United Network for Organ Sharing) allow an overview of the transplant activity nationally. We accessed and collected data through the sintra.incucai.gov.ar website on May 1, 2017.

Descriptive analysis was used to characterize the study population, expressing results in percentages, medians, and interquartile ranges (IQRs). Various liver centers were identified, keeping their names anonymous and only showing the data of HEC. Two categories were used to classify these data: adult versus pediatric populations, and private versus public financing.

Univariate comparisons were performed in the prespecified categories to analyze the access to grafts according to the MELD/ Pediatric End-Stage Liver Disease (PELD) system, and emergency or MELD/PELD exceptions with the Mann-Whitney *U* test (assuming nonnormal distribution). *P* values < .05 were accepted as indicating a statistically significant difference.

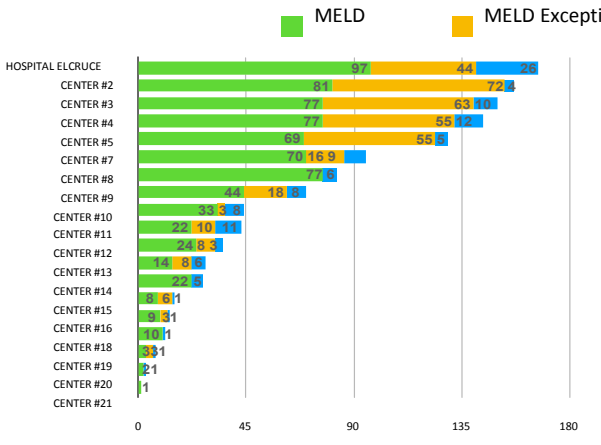
RESULTS

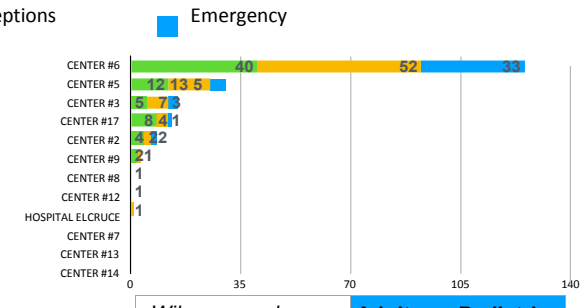
A total of 1434 liver transplants were performed nationally:

12.34% were by emergency status, and 56.6% were by MELD/PELD, with a median graft assignment position of 5 in 57.2 days (Table 1). The median MELD access was 29 points. Overall, 31.1% of the patients accessed liver transplantation according to MELD exceptions, 55.8% of which were due to Milan hepatocellular carcinoma. Overall, % of the patients had fixed non-ruled MELD exceptions, and 4.7% had non-ruled MELD exceptions with an increase of 1 point after 3 months on the waiting list. Thirteen percent were patients who accessed transplantation through other ruled MELD exceptions.

A total of 167 liver transplantations were performed at HEC: 15.6% were by emergency status and 58.1% by MELD (none PELD), similar to national figures. The median graft assignment position was 4 in 19.1 days; the median MELD access was 28 points. Overall, 26.9% accessed liver trans- plantation according to MELD exceptions, 68.9% due to hepatocellular carcinoma, with a median graft assignment position of 14.5 in 262 days (Table 1).

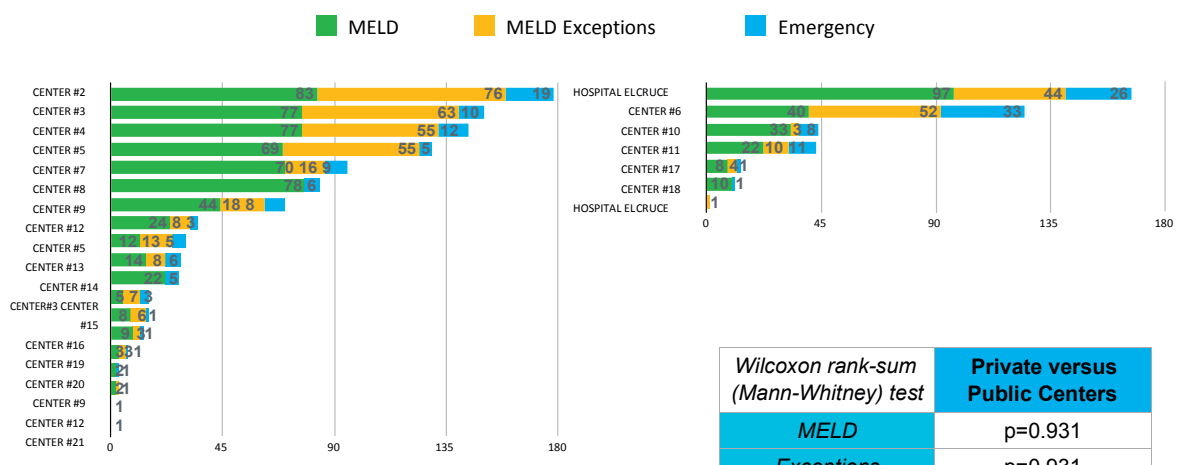
Univariate analysis was performed dividing the amount of transplants performed in each liver transplant center between the adult and pediatric populations. It found that there was no difference in the size of the populations that accessed a graft in emergency or MELD/PELD exceptions. Nevertheless, pediatric populations exhibited less access to a graft compared with adults (*P* ¼ .018), when MELD/ PELD is not determined by exceptions. When the Mann-Whitney *U* test was performed to analyze private versus





Wilcoxon rank-sum (Mann-Whitney) test	**Adults vs Pediatrics**
MELD	p=0.018
Exceptions	p=0.568
Emergency	p=0.101

Fig 1. Graphic representation of individual transplant activity stratified according to adult versus pediatric populations. Abbreviation: MELD, Model for End-Stage Liver Disease.



Wilcoxon rank-sum (Mann-Whitney) test	**Private versus Public Centers**
MELD	p=0.931
Exceptions	p=0.931
Emergency	p=0.398

Fig 2. Graphic representation of individual transplant activity stratified according to private versus public financing. Abbreviation: MELD, Model for End-Stage Liver Disease.

public financing, there was no statistically significant difference in the size of the populations in the 3 categories (Figs 1 and 2).

DISCUSSION

Overall, 31.1% of liver transplants performed between January 2013 and April 2017 were in patients who had MELD exception points on the waiting list, illustrating that those exceptions are becoming the rule to access a liver graft. This finding has been previously reported by other authors [1,4,5]. Since 2005, there has been no adjustment on the points given to the ruled MELD exceptions in Argentina, and more than one-third of the MELD exception points are not ruled.

Does it mean that forced changes should be introduced to restore justice in MELD allocation? Even the statements proclaimed at the First Argentinian Liver Transplant Consensus [6] seem unrealistic in terms of the actual reality of graft scarcity. For instance, the median MELD score to access a liver in 2013 was 25 points, in 60 days, compared with 2017, during which the median MELD score to access a liver was 26 points, in 126 days. Applying new MELD exceptions with fixed points and not adapting them to the present times does not seem sufficient. Nevertheless, the MELD-Na score seems to be a promising alternative, together with efforts to encourage liver transplant centers to incorporate living donor liver transplantation. Living donor liver transplantation has not yet been fully developed in the region as an alternative to supply the continually increasing demand of liver grafts [7].

Another aspect that should be taken into account is the reduced waiting list time for a patient at the HEC compared with the rest of the centers, illustrating the different criteria in the graft acceptance policy in Argentina. It has been pre- viously reported that livers were recovered in only one-half of the available deceased donors [8]. HEC reflects a wide acceptance policy regarding liver grafts, with no impact on the outcomes when using organs previously rejected 12 times (beyond percentile 75 of the median of rejected offers before graft acceptance in Argentina during 2013e2016) [9]. We believe that a combination of a large waiting list and an aggressive transplant policy is responsible for the high transplant rate at the HEC [10]. Further studies nationally and throughout Latin America should be conducted to establish donor acceptance criteria to understand and intro- duce modifications into the present graft allocation system.

CONCLUSIONS

Our center has a large proportion of recipients transplanted by emergency status and MELD; with a similar MELD ac- cess, our waiting list time is substantially shorter for our pa- tients, reflecting a wide policy of acceptance for liver grafts, notwithstanding the severity of patients on the waiting list.

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