Conflicts of Interest

Nothing to disclosure
LIVER TRANSPLANTATION IN BRAZIL

- geographic information
- historical aspects
- legislation
- financing
- liver transplant activities and results
- present and future challenges
Brazil

Population: 190,755,799

Area: 8,515,767 Km²

Density: 22.4 inhab/Km²

GDP: US$ 2,355 trillions

GDP/inhab: US$ 11,875.25
LIVER TRANSPLANTATION IN BRAZIL

historical aspects

- 1968 to 1972 – 5 unsuccessful attempts – São Paulo
- 1985 – first long-term survival – São Paulo
- 1989 – 1st living-related liver transplant – São Paulo
- 1989-91 – 1st transplants outside São Paulo
  - Minas Gerais, Paraná, Rio Grande do Sul
LIVER TRANSPLANTATION IN BRAZIL

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LIVER TRANSPLANTATION IN BRAZIL

legislation

- 1988 – current Brazilian Constitution
  - Sistema Único de Saúde (SUS)
- 1997 – current Transplant Law
  - fair waiting list
  - Sistema Nacional de Transplantes
- 2005 – Organ and Tissue Transplant Internal Comission
  - CIHDOTT (hospitals with > 80 beds)
LIVER TRANSPLANTATION IN BRAZIL

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Health expenditure as a share of GDP, OECD countries, 2010
Health expenditure per capita, public and private expenditure, OECD countries, 2010

1. In the Netherlands, it is not possible to distinguish clearly the public and private share for the part of health expenditures related to investments.

Data are expressed in US dollars adjusted for purchasing power parities (PPPs), which provide a means of comparing spending between countries on a common base. PPPs are the rates of currency conversion that equalise the cost of a given ‘basket’ of goods and services in different countries.
SUS

- SUS - Unified Health System
  - Federal
  - States
  - Municipalities

- 80% of the population depends exclusively of SUS
- 20% - private medicine
LIVER TRANSPLANTATION IN BRAZIL

financing

- 95% of transplants within SUS
  - US$ 500,000,000.00 / year
    - brain death diagnosis
    - organ procurement
    - transplants
    - medication
LIVER TRANSPLANTATION IN BRAZIL

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Liver Transplantation in Brazil


The first successful liver transplant in humans was performed in 1962 by Thomas Starzl in Denver, Colorado. The high complication and mortality rate due to technical and clinical problems delayed the progress of that procedure for more than one decade. Progress in immunosuppression and organ preservation, the development of operative techniques, and the broader knowledge of postoperative problems resulted in a dramatic improvement in survival rates in the last 30 years. The introduction of cyclosporine (CyA) in 1979 radically contributed to the result of the procedure. The University of Wisconsin (UW)-Belzer solution, introduced in 1987, also facilitated the procedure, conferring a semilecitive character to a surgery that until then had been always performed in emergency conditions. Moreover, in 1983, the US National Institute of Health (NIH) organized a meeting to establish a consensus on the role of liver transplantation at that time. The procedure was no longer considered experimental and instead represented a therapeutic modality indicated for patients in the terminal phase of liver disease. The results obtained until then justified its broader application in specialized centers and coverage by health insurance companies.

In Brazil, the first five attempts were performed in the Hospital das Clínicas da FMUSP between 1968 and 1972, all without success. As in other pioneer centers, in Brazil there was an interruption due to initial bad results. New attempts were carried out only in 1985, when the Liver Unit of the Hospital das Clínicas da FMUSP (School of Medicine of the University of São Paulo) performed the first successful liver transplant in Latin America.

Since then, the number of Brazilian centers has been increasing progressively and, as of December 1996, 19 groups had performed at least one liver transplant. The aim of this study is to report the evolution of the annual number of liver transplants performed and the results of patient survival in the country.

Materials and Methods

Questionnaires were sent to all 19 Brazilian liver transplant groups requesting the following information: date of the start of the program; number of transplants performed each year as of December 31, 1996; the duration of patient follow-up; and the number of postoperative deaths in the first month and in the first, third, and fifth years. It was possible to obtain only data concerning the annual number of transplants from the groups that did not answer the questionnaire through the registry of the Health Secretariat of the corresponding state. Patient actuarial survival was calculated by the “fixed recognized point” method.

Results

Twelve of the 19 groups answered the questionnaires, including 8 located at public university hospitals, 1 at a...
Fig 2. Regional distribution of liver transplant teams in Brazil. 0, cities with liver transplant teams; number of liver transplant teams is shown in parentheses.
Fig 1. Number of liver transplants performed in Brazil per year.
Twenty Years of Liver Transplantation in Brazil


ABSTRACT

This paper summarizes the 20 years of liver transplantation in Brazil, in the context of the Western world scenario. More than 5000 liver transplantations have been performed in the country since September 1, 1985. The living-donor liver transplantation, one of the landmarks in liver transplantation, was first described by our team in 1989. Brazil is the seventh country in number of liver transplants in the Western world and the first in Latin America. Almost 1000 procedures were performed in 2004, 19% of them involving living donors.

Liver transplantation (OLT) is a complex surgical procedure, presently performed in many countries around the world. Since the first experimental orthotopic liver transplantation performed by Moore in 1959, the first human operation performed by Starzl in 1963, and the first successful human liver transplantation by Starzl in 1967, several surgical teams in the United States and Europe have established liver transplantation programs. In Brazil, several attempts were made between 1968 and 1972 with bad results. The first successful liver transpl-

Brazil. Adult-to-adult living donor OLT increase every year. In 2000, they represented about 9% of OLTs. In 2004, 934 OLTs were performed, 19.1% involving living donors. In conclusion, OLT is a routine procedure in many centers in Brazil. Brazil is now one of the main OLT countries in the Western world, ranking in seventh place in terms of number of procedures, after the United States, Spain, United Kingdom, France, Germany, and Italy.
Ministry of Health authorized teams
(up to April, 8th, 2005)

Cities with transplant teams

n = 62
Liver transplantation activities, 2012*

Liver transplants per million population:
- 0–2.4
- 2.5–4.9
- 5.0–9.9
- 10.0–14.9
- 15.0–19.9
- ≥20

Data not available
Not applicable

* data from the Global Observatory on Donation and Transplantation

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: Global Observatory on Donation & Transplantation Map Production: Health Statistics and Information Systems (HSI), World Health Organization
Liver Transplantation Activities in 2012

The graph shows the liver transplantation activities in different countries in 2012. The blue bars represent deceased donors, and the red bars represent living donors. The countries are listed in alphabetical order, and their respective numbers of transplants are indicated on the horizontal axis.

- EUA (United States): 5134
- Brasil (Brazil): 1712
- Coreia do Sul (South Korea): 1244
- França (France): 1170
- Espanha (Spain): 1084
- Alemanha (Germany): 1015
- Italia (Italy): 1001
- Turquia (Turkey): 1001
- Reino Unido (United Kingdom): 674
- Taiwan: 497
- Irã (Iran): 468
- Canadá (Canada): 398
- Argentina: 373
- Polonia (Poland): 327
- Bélgica (Belgium): 282
- Russia: 243
- Austrália (Australia): 234
- Colômbia (Colombia): 221
- Portugal: 168
- Suécia (Sweden): 149
- Holanda (Netherlands): 146
- Croácia (Croatia): 132
- Arábia Saudita (Saudi Arabia): 132
- República Tcheca (Czech Republic): 114
- México (Mexico): 106
- Suíça (Switzerland): 105
- Noruega (Norway): 100
- Israel: 49
- Hungria (Hungary): 41
- Venezuela: 9
liver transplants per year  

patients actuarial survival
Consequences of the Implementation of the Model for End-stage Liver Disease System for Liver Allocation in Brazil


ABSTRACT

Background. In July 2006, the system for liver allocation in Brazil started to rely on the Model for End-stage Liver Disease (MELD) scale, replacing the previous chronological criteria. Under the new system, the score for listing pediatric patients is obtained by multiplication of the calculated PELD score by 3. The current criteria also features extra points for diseases such as hepatocellular carcinoma (HCC). This study sought to analyze the consequences of implementation of the MELD system on waiting list mortality, posttransplant survival rates and characteristics of the transplanted patients.

Methods. We retrospectively studied data from the State Health Secretariat of São Paulo, regarding all patients registered on the waiting list for liver transplantation in the State of São Paulo, in two periods: July 2005 to July 2006 (pre-MELD era) and July 2006 to July 2010 (MELD era). Patient survival rates calculated using the Kaplan-Meier method were compared by the log-rank test. P values < .05 were considered statistically relevant.

Results. After implementation of the MELD, waiting list registrations decreased by 39.8%; the percentage of transplants in HCC recipients increased from 2.4% to 23.7%; pediatric transplants increased from 6.5% to 9.3%; deaths on the list fell from 599 in the pre-MELD era to 359 in the last year analyzed; recipients with higher MELD displayed significantly lower posttransplant survival rates; HCC patients, better survival after transplantation (P = .002); No difference was observed comparing survival rates between pre-MELD and MELD eras (P = 474) or between adults and children (P = .867).

Conclusion. Under the MELD system for liver allocation in Brazil, there was a reduction in waiting list mortality and an increased number of transplantations in pediatric and HCC recipients. Survival rates of patients with higher MELD score were inferior. However, this result was offset by the greater survival in HCC recipients, with no difference in patient survival rates between the pre-MELD and MELD eras.
worse outcome without surgery. The organ allocation systems seek to achieve utility of grafts associated with equity in the treatment of patients. The goals are to avoid waiting list mortality and simultaneously have high survival rates after transplantation. In July 2006, the system for liver allocation in Brazil began to rely on the Model for Endstage Liver Disease (MELD), a continuous weight scale that prioritizes patients according to severity of hepatic disease, replacing the previous chronological criteria. Under the new system, the score for listed pediatric patients (under 12 years old) is obtained by the multiplication of the calculated PELD score by 3. The current criteria also...

RESULTS
Immediately after implementation of the MELD system, there was a 39.8% decrease in waiting list registrations, decreasing from 1887 in the pre-MELD era to 1137 in the first year of the MELD era (Fig. 1). The number of deceased donor transplants steadily increased from 324 in the pre-MELD era to 652 in the last year analyzed (Table 1). The percentage of transplantations for HCC patients increased from 2.4% in the pre-MELD to 23.7% in the MELD era (Table 1). Pediatric transplants increased from 6.5% (21/324) to 9.3% (182/1949). Deaths per year on the waiting list decreased from 235 in the pre-MELD era to 164 in the MELD era (Table 1).
Fig 2. Number of deaths on the waiting list, year by year.
lista de espera

transplante

óbitos em lista

transplante
Fig 3. Patient survival rates. (A) Patient survival rates by Model for End-stage Liver Disease (MELD) score. Were excluded pediatric patients and those under a “special situation”. (B) Hepatocellular Carcinoma (HCC) receptors versus other patients. (C) Pre-MELD era versus MELD era. (D) Adult patients versus pediatric patients.
Year 2007 to 2011

MELD < 10
MELD 10 - 19
MELD 20 - 30
MELD > 30
18 active centers in São Paulo city in 2013
Center Competition and Outcomes Following Liver Transplantation

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In the United States, livers for transplantation are distributed within donation service areas (DSAs). In DSAs with multiple transplant centers, competition among centers for organs and recipients may affect recipient selection and outcomes in comparison with DSAs with only 1 center. The objective of this study was to determine whether competition within a DSA is associated with posttransplant outcomes and variations in patients wait-listed within the DSA. United Network for Organ Sharing data for 38,385 adult cadaveric liver transplant recipients undergoing transplantation between January 1, 2003 and December 31, 2009 were analyzed to assess differences in liver recipients and donors and in posttransplant survival by competition among centers. The main outcome measures that were studied were patient characteristics, actual and risk-adjusted graft and patient survival rates after transplantation, organ quality as quantified by the donor risk index (DRI), wait-listed patients per million population by DSA, and competition as quantified by the Hirschman-Herfindahl index (HHI). Centers were stratified by HHI levels as no competition or as low, medium (or mid), or high competition. In comparison with DSAs without competition, the low-, mid-, and high-competition DSAs (1) performed transplantation for patients with a higher risk of graft failure [hazard ratio (HR) = 1.24, HR = 1.26, and HR = 1.34 (P < 0.001 for each)] and a higher risk of death [HR = 1.21, HR = 1.23, and HR = 1.34 (P < 0.001 for each)] and for a higher proportion of sicker patients as quantified by the Model for End-Stage Liver Disease (MELD) score [median MELD score = 14, 15, and 16 (P < 0.001 for each)].
Figure 2. Comparison of (A) observed graft survival and (B) observed patient survival after liver transplantation by the HHI level.
LIVER TRANSPLANTATION IN BRAZIL

liver transplant activity and results

- regional disparities

- high MELD score patients – São Paulo

- competition

- social limitations
São Paulo state      41.262.199
Area    248.222 km2
Density         166/Km2
GDP      US$  630 Bi
GDP/inhab     US$ 15.300
São Paulo City 11,320,000
area 1,523 km²
Density 7,432/Km²
GDP US$ 261.8 Bi
GDP/inhab US$ 23,127

6% of population – 12% GDP Brazil
Figura 1.

Fonte: IBGE / Compilado pela Scot Consultoria - www.scotconsultoria.com.br
Nota: A população que não apresenta rendimento ou não o declarou foi excluída da análise. As faixas de renda foram classificadas da seguinte forma: 1 (até meio salário mínimo), 2 (de meio a 1 salário mínimo), 3 (de 1 a 2 salários mínimos), 4 (de 2 a 3 salários mínimos), 5 (de 3 a 5 salários mínimos), 6 (de 5 a 10 salários mínimos), 7 (de 10 a 20 salários mínimos) e 8 (mais que 20 salários mínimos).
Figura 2.

Nota: Considera-se classe baixa a faixa da população que contém os 20,0% mais pobres, assim como na classe alta os 20,0% mais ricos. A classe média é caracterizada pelo restante da população (60,0%), avaliada em subgrupos (baixa, média e alta).
Central Hospital - 1884

Colleges of Medicine

- USP: 1913 a 1948
- EPM (Unifesp): 1933 a 1953
- Santa Casa: since 1963
não-adesão (n=22)
adesão (n=47)

(p=0,0005)
(p=0,0007)

deseestruturação familiar
dificuldades econômicas
p = 0.1765
p=0.0627
LIVER TRANSPLANTATION IN BRAZIL

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Thank You!