

Special article

Spanish Heart Transplantation Registry. 27th Official Report of the Spanish Society of Cardiology Working Group on Heart Failure and Heart Transplantation (1984-2015)

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ABSTRACT

Keywords:
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Introduction and objectives: The present article reports the characteristics and results of heart transplants in Spain since this therapeutic modality was first used in May 1984.

Methods: We describe the main features of recipients, donors, surgical procedures, and results of all heart transplants performed in Spain until December 31, 2015.

Results: A total of 299 cardiac transplants were performed in 2015, with the whole series comprising 7588 procedures. The main transplant features in 2015 were similar to those observed in recent years. A remarkably high percentage of transplants were performed under emergency conditions and there was widespread use of circulatory assist devices, particularly continuous-flow left ventricular assist devices prior to transplant (16% of all transplants). Survival has significantly improved in the last decade compared with previous time periods.

Conclusions: During the last few years, between 250 and 300 heart transplants have consistently been performed each year in Spain. Despite a more complex clinical context, survival has increased in recent years.

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RESUMEN

Palabras clave:
Trasplante cardíaco
Registro
Supervivencia

Introducción y objetivos: Se presentan las características y los resultados del trasplante cardíaco en España desde que empezó su actividad en mayo de 1984.

Métodos: Se realiza un análisis descriptivo de las características de los receptores, los donantes, los procedimientos quirúrgicos y los resultados de los trasplantes cardíacos realizados en España hasta el 31 de diciembre de 2015.

Resultados: Durante 2015 se han realizado 299 procedimientos, con lo que la serie histórica consta de 7.588 trasplantes. Las características generales del procedimiento son similares a las observadas en los últimos años y destacan el alto porcentaje de procedimientos realizados en código urgente y, sobre todo, la extensión del uso de dispositivos de asistencia circulatoria, particularmente la asistencia ventricular de flujo continuo (el 16% del total de trasplantes). La supervivencia ha aumentado significativamente en la última década con respecto a periodos anteriores.

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\diamond The collaborators are listed in the [appendix](#).

Conclusiones: La actividad de trasplante cardiaco en España permanece estable en los últimos años, con alrededor de 250-300 procedimientos al año. A pesar de la mayor complejidad del contexto clínico, se observa una mejora de la supervivencia en los últimos años.

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Abbreviations

ECMO: extracorporeal membrane oxygenation
RETC: Spanish Heart Transplantation Registry (*Registro Español de Trasplante Cardiaco*)

INTRODUCTION

Since 1991, the Spanish Heart Transplantation Registry (*Registro Español de Trasplante Cardiaco* [RETC]) has published an annual description of the clinical and surgical characteristics and general results of all heart transplant procedures performed in Spain¹⁻²⁶. The current article reports data on the transplant population until 31 December 2015. As is already well-known, the main strength of the RETC lies in its inclusion and comprehensive updating of all heart transplant procedures performed in all Spanish hospitals since May 1984, regardless of the procedural characteristics and results. In addition, data collection is prospectively performed using a shared database developed and updated by all transplant teams.

METHODS

Patients and Centers

Of the 19 centers that have contributed data to the RETC, 18 are currently active (Table 1). Two centers are entirely dedicated to pediatric transplantation while another 3 perform both pediatric and adult transplantation. The numbers of procedures performed

Table 1

Centers (by Order of First Transplantation Performed) Participating in the Spanish Heart Transplantation Registry (1984-2015)

1. Hospital de la Santa Creu i Sant Pau, Barcelona
2. Clínica Universitaria de Navarra, Pamplona
3. Clínica Puerta de Hierro, Majadahonda, Madrid
4. Hospital Marqués de Valdecilla, Santander
5. Hospital Reina Sofía, Córdoba (adult and pediatric)
6. Hospital Universitario y Politécnico La Fe, Valencia
7. Hospital Gregorio Marañón, Madrid (adult and pediatric)
8. Fundación Jiménez Díaz, Madrid (1989-1994)
9. Hospital Virgen del Rocío, Seville
10. Hospital 12 de Octubre, Madrid
11. Hospital Universitario de A Coruña, A Coruña (adult and pediatric)
12. Hospital de Bellvitge, L'Hospitalet de Llobregat, Barcelona
13. Hospital La Paz, Madrid (pediatric)
14. Hospital Central de Asturias, Oviedo
15. Hospital Clínic, Barcelona
16. Hospital Virgen de la Arrixaca, El Palmar, Murcia
17. Hospital Miguel Servet, Zaragoza
18. Hospital Clínico, Valladolid
19. Hospital Vall d'Hebron, Barcelona (pediatric)

annually are summarized in Figure 1. The whole series comprises 7588 procedures. Data were lost on 12 patients, including follow-up information. These patients have been omitted from the analysis, giving a final sample size of 7576 patients. Of the 299 procedures performed in 2015, 22 (7.4%) were performed in pediatric patients (age < 16 years). The types of procedures performed in 2015 and in the whole series are summarized in Table 2.

Procedures

The database comprises 175 clinical variables, established by consensus among all the teams, and records data on recipients, donors, surgical techniques, immunosuppression, and follow-up. Since 2013, the data have been electronically introduced and updated in real time using a web-based program specifically designed for this purpose. The database support is a Microsoft Excel file. This procedure replaces the previous method, in which each center sent data to the registry director in Microsoft Access file format via email. An external CRO (contract research organization), currently ODDS S.L., performed database maintenance, quality control, and statistical analysis.

Ethics committee approval, auditing, and registration with the Ministry of Health were performed in accordance with the Spanish Organic Law on Data Protection 15/1999.

Statistics

Continuous quantitative variables are presented as mean \pm standard deviation; categorical variables are presented as percentages. The results are categorized according to the year of transplantation and the total sample has been divided into 4 time periods (1984-1993, 1994-2003, 2004-2013, and 2014-2015). Some variables were also analyzed according to the annual data from the whole series, such as donor age, emergency transplants, and ischemia time. Differences among groups were analyzed using a nonparametric test for temporal trends (Kendall τ) for categorical variables and analysis of variance test with polynomial fit for continuous variables. Survival curves were calculated using the Kaplan-Meier test and were compared using a log rank test. A *P* value < .05 was considered statistically significant.

RESULTS

Recipient Characteristics

In 2015, the recipients had a mean age of 49.5 ± 16.5 years (range, 0.14-73 years); 76% were men, with the following underlying diagnoses: ischemic cardiomyopathy (21.4%), nonischemic dilated cardiomyopathy (30.4%), valvular heart disease (4.0%), and other etiologies (44.2%). Recipient characteristics by transplant period are summarized in Table 3. There were significant trends toward older recipients, female sex, atypical causes of underlying heart disease, and an increase in pretransplant conditions with known prognostic effects, such as insulin-dependent diabetes mellitus, infection, cardiac surgery, and mechanical ventilation prior to transplant. Although the difference was not statistically significant, the proportion of

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