Corneal Donor Profile and Evolution of Corneal Donation in a Brazilian State Where the Number of Individuals on the Waiting List Reached Zero But Increased Again

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ABSTRACT

Background. In most countries, the amount of corneal graft tissue available for transplantation is insufficient to meet demand. In 2010, there were 459 patients on the waiting list for corneal transplantation (WLCT) in Espirito Santo (ES), a Brazilian state with 3,885,000 inhabitants. Several strategies were implemented to reduce the number of individuals on the WLCT, which reached zero in 2011. Studies on the evolution of corneal donation contribute to reducing the WLCT worldwide. The aim of this study was to describe the evolution of corneal donation in ES and the profile of corneal donors from 2010 to 2013.

Methods. This was a retrospective study. The data were collected from records referring to donations of corneas and from the archives of the Center for Organ Procurement and Distribution of ES. Statistical software was used to perform descriptive analysis of the data.

Results. The sample consisted of 1359 donors, aged 46.82 ± 17.32 (mean ± standard deviation), 70.1% of whom were male. Most of the consent forms for donation were signed by the sons of the donors. In 2011, there was a major increase (105%) in the number of corneal transplants compared with 2010; consequently, the number of patients on the WLCT reached zero, but increased again, reaching 139 patients in 2013.

Conclusion. This study shows that strategies to increase corneal donations should be continued even after reduction or elimination waiting time on the WLCT.

A RECENT survey performed in 116 countries showed that, in most countries, the amount of corneal graft tissue available for corneal transplantation (CT) is insufficient to meet demand. In fact, this survey globally quantified the considerable shortage of corneal graft tissue, with only 1 cornea available for every 70 needed [1].

In 2011, 21,110 CTs were carried out in 13 Latin American countries, of which 14,672 occurred in Brazil [2]. However, there are considerable disparities in the effectiveness of CT programs among the regions of Brazil [3]; consequently, the average time on the waiting list for corneal transplantation (WLCT) can vary, depending on the state and region [3–7]. In 2010, there were 459 patients on the WLCT in Espirito Santo (ES), a Brazilian state with 3,885,000 inhabitants. Several strategies were implemented to reduce the number of individuals on the WLCT, which reached zero in 2011 [5]. Knowledge regarding the evolution of corneal donation (CD) in different countries can contribute to reducing the WLCT. The aim of this study was to describe the evolution of corneal donation in ES and the corneal donors' profile from 2010 to 2013.

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MATERIALS AND METHODS

This retrospective study was approved by the ethics committee for human experimentation of the Universidade Federal do ES (Protocol 470.754). The sample consisted of all individuals in ES who died and were cornea donors between January 2010 and December 2013. The data were collected from the records referring to corneal donations of this period and from the archives of the Center for Organ Procurement and Distribution of ES regarding the WLCT. SPSS version 18 software (IBM-SPSS, Armonk, NY) was used to perform descriptive analyses of the data. Categorical variables were expressed as absolute and relative frequency and metric quantitative variables were expressed as the mean ± standard deviation (SD).

RESULTS

The sample consisted of 1359 corneal donors, of whom 70.13% were male. Overall age (mean ± SD) was 46.82 ± 17.32 years, ranging from 2 to 82 years, and 189 donors were >65 years old (13.91%). Regarding marital status, 34.95% of the medical records did not have this information. The relatives of the donors who more frequently signed consent forms for donation (33%) were sons or daughters. Most corneal donors (79.5%) resided in the metropolitan region, and died in hospitals (76.16%) (Table 1).

In 2010, only 212 cornea donations were performed, 15.6% of the total donations of the study. The highest number of donations occurred in 2011 (n = 490, 36.1%), when the WLCT reached zero. In the next 2 years, the number of corneal donations decreased (Table 2).

The WLCT had 214 patients in January 2011, was zero in September 2011, oscillated from 1 to 25 patients during 2012 and finished the year with 1 patient, and showed a progressive increase throughout 2013 as follows−17 (from January to March), 42 (April), 49 (May), 63 (June), 63 (July), 74 (August), 84 (September), 93 (October), 129 (November), and 139 (December).

The annual numbers of CTs were 159 (2010), 326 (2011), 304 (2012), and 213 (2013).

Actions implemented in 2010 and 2011 in ES, with the aim of reducing the WLCT, are mentioned in what follows; however, we were unable to assess the relative efficiency of each of them, as this was a retrospective study, and assessment of these strategies was not the objective of our research. The actions included: (1) Inauguration of a new eye bank. Before that, there was only 1 eye bank in ES. (2) Increasing the age limit for corneal donation from 65 to 75 years old. (3) Educational and motivational programs about corneal donation, including courses, symposiums, and training programs, were offered to hospital staffs and to other health professionals in all regions of ES. Many of these events were organized by a nongovernmental organization in partnership with public and private services. (4) A Congress on Organ and Tissue Donation took place in December 2010 in ES. (5) Campaigns were undertaken to raise awareness of the population about donations of organs and tissues.

Table 1. Demographic Characteristics of Corneal Donors From January 2010 to December 2013, Espirito Santo, Brazil

Demographic Characteristics	n	%
Sex		
Male	953	70.13
Female	406	29.87
Age (years)		
2–10	8	0.59
10–19	102	7.50
20–29	187	13.76
30–39	144	10.60
40–49	209	15.38
50–59	337	24.80
60–69	259	19.06
70–82	106	7.80
Without information	7	0.51
Marital status		
Single	382	28.11
Married	379	27.89
Divorced	71	5.22
Widower	52	3.83
Without information	475	34.95
Donor's relative who authorized the donation		
Daughter or son	448	32.96
Sister or brother	331	24.36
Wife or husband	204	15.01
Mother	138	10.15
Father	88	6.48
Grandmother or grandfather	2	0.15
Grandchild	1	0.07
Without information	147	10.82
Region of residence in state		
Metropolitan region	1081	79.54
Central region	50	3.68
South region	50	3.68
Other states	22	1.62
North region	17	1.25
Without information	139	10.23
Place of death		
Hospital	1035	76.16
Highways, roads, or public spaces	90	6.62
Home	36	2.65
Emergency care units	31	2.28
Place of work	5	0.37
Ambulance	4	0.29
Without information	158	11.63
Total	1359	100.00

DISCUSSION

In this study, most of the corneal grafts were from male donors, which corroborates other studies conducted in Brazil [6,8,9] and New Zealand [10], where the higher percentage of male donors was explained by the greater prevalence of male deaths in younger age groups resulting from trauma and cardiovascular disease [10], which is similar to some Brazilian data [6,8,9]. However, 2 studies carried out in China showed a higher prevalence of female donors, probably due to cultural reasons [11,12].