

Analysis of the epidemiological profile of patients submitted to corneal transplantation in the Espírito Santo

Análise do perfil epidemiológico dos pacientes submetidos a transplante de córnea no Espírito Santo

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ABSTRACT

Objective: To describe the epidemiological profile of patients submitted to corneal transplantation in state of Espírito Santo, Brazil.

Methods: Transversal and descriptive study, with 1301 patients, in the period of January 2017 until to January 2018, the patients were registered in the Central Notification, Captation and Distribution of Organs of Espírito Santo (CNCDO/ES) through the National Transplant System (SNT) and submitted to corneal transplantation. The data were shown as descriptive statistics (frequencies and medians) and analysis of the data was performed using SPSS software, 23 version. **Results:** In relation to frequency, it was obtained 54.5% female, 57.33% from the metropolitan area of Vitória. Eighty-six percent were patients from Espírito Santo and the others 6.3% were from Rio de Janeiro, Minas Gerais and Bahia. The main indications for corneal transplantation were Bullous Keratopathy (25.9%), Keratoconus (16.5%) and interstitial keratitis (15.5%). The average of waiting time was 195 days and the longest was 1345 days. It was found that 1301 patients underwent corneal transplantation, they are in the 57-year age group, and the biggest part of them are from the metropolitan area of Vitória. **Conclusion:** The most prevalent diagnoses in patients submitted to corneal transplantation in state of Espírito Santo were Bullous Keratopathy and Keratoconus, in patients mostly female, 57 years old on average, from the metropolitan region of greater Vitória and from the state itself. The study allows to outline prevention strategies, care and social actions to raise awareness of corneal donation.

Keywords: Corneal transplantation/epidemiology; Cornea/surgery; Health services research

RESUMO

Objetivo: Descrever o perfil epidemiológico dos pacientes submetidos a transplante de córnea no estado do Espírito Santo. **Métodos:** Estudo transversal e descritivo realizado entre o período de janeiro de 2017 a janeiro de 2018, com o total de 1310 cadastrados na Central de Notificação, Captação e Distribuição de Órgãos do Espírito Santo (CNCDO/ES) por meio do Sistema Nacional de Transplantes (SNT) e que foram submetidos a transplante de córnea. Os dados foram apresentados em estatística descritiva como frequências e mediana e a análise dos dados foi realizada com o software SPSS versão 23. **Resultados:** em relação à frequência, obteve-se 54,3% do gênero feminino, 57,33% (751) provenientes da Região Metropolitana de Vitória. Os pacientes do Espírito Santo correspondem a 86% da frequência na fila, seguidos por Rio de Janeiro, Minas Gerais e Bahia, que juntos correspondem a 6,3%. O principal diagnóstico na indicação de transplante foi a Ceratopatia Bolhosa (25,9%), seguido por Ceratocone (16,5%) e Ceratite Intersticial (15,5%). A média de tempo de espera foi de 195 dias, sendo no máximo 1345 dias. Verificou-se que 1310 pacientes foram transplantados de córnea, a faixa etária dos transplantados é de 57 anos, sendo a maioria destes da Região Metropolitana de Vitória. **Conclusão:** Os diagnósticos mais prevalentes nos pacientes transplantados no Espírito Santo foram Ceratopatia Bolhosa e Ceratocone, em pacientes majoritariamente do sexo feminino, 57 anos em média, da região metropolitana da grande Vitória e provenientes do próprio estado. O estudo permite traçar estratégias de prevenção, cuidado e ações sociais de conscientização de doação de córnea.

Descritores: Transplante de córnea/epidemiologia; Córnea/cirurgia; Pesquisa nos Serviços de Saúde

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The authors declare no conflict of interest

Received for publication 6/5/2020 - Accepted for publication 15/9/2020

INTRODUCTION

Brazil is a world reference in the transplantation field and has the largest public transplant system in the world. Currently, approximately 96% of all transplantation procedures in the country are financed by Sistema Único de Saúde (Unified Health System - SUS). Brazil is the second country in absolute numbers of transplantations, after the USA.⁽¹⁾ According to Law n. 10.211 from March 23, 2001, family authorization is required for an organ donation to occur in Brazil, after a death case.⁽²⁾

Brazilian law and organization establish a decentralized network nowadays, it is divided into four hierarchical integrated levels: national level - Sistema Nacional de Transplantes (National Transplantation System) and Central Nacional de Notificação, Captação e Distribuição de Órgãos (Notification, Procurement and Distribution of Organs National Center - CNCDO), regional and state level - Central de Notificação, Captação e Distribuição de Órgãos (Notification, Procurement and Distribution of Organs Center - CNCDO), local level - Comissões Intra-hospitalares de Doação de Órgãos e Tecidos para Transplantes (Intra-hospital Organ and Tissue Donation for Transplants Commissions - CIH-DOTT). In addition, there is the Eye Bank, which is an institution responsible for removing, transporting, assessing, classifying, preserving, storing and making available donated eye tissues, as well as for carrying out quality control of these tissues. The aforementioned units coordinate transplants at national, regional, state and local level, from brain death diagnosis to family members' consultation and organ's removal and allocation.⁽³⁻⁶⁾

Espírito Santo State/Brazil has a string structure focused on the organ and tissue transplantation field, which has been particularly developed. The state ranked the 21st position in the national rank of transplants in 2002 and became the 3rd state with the best performance in the transplantation field in 2010. Cornea, liver, heart, bone, kidney and autologous bone marrow transplants are currently performed in the state.⁽⁷⁾

The indication for cornea transplantation in Brazil varies in different regions countrywide. The healthy cornea has satisfactory transparency and adequate curvature, but if it loses its integrity it becomes blurred, out of focus and light does not reach the retina, a fact that significantly impairs the vision and causes different disorders capable of hindering patient's development of daily activities or even complete vision loss. The second cause of reversible blindness worldwide are diseases that affect the cornea, such as chronic, inflammatory, infectious or degenerative diseases and trauma, which lead to the need for tissue transplantation.^(8,9) The cornea that has lost its transparency is replaced by a healthy one during in the transplantation. Cornea procurement is easier and lesser restricted than other organs such as liver, kidney and pancreas.⁽¹⁰⁾ Therefore, the aim of the current study was to describe the epidemiologic profile of patients subjected to cornea transplant in Espírito Santo State/Brazil

METHODS

Cross-sectional and descriptive study based on the assessment of medical records from Espírito Santo State Notification, Procurement and Distribution of Organs Center (CNCDO/ES) through the National Transplant system (SNT) in Espírito Santo State/Brazil from January 2017 to January 2018. The current research found 1,310 medical records of patients subjected to cornea transplant. The sample was selected by convenience

among medical records from CNCDO/ES. Every patient aged 18, or older, from both sexes, who were registered in CNCDO/ES and waiting for a cornea transplant were included in the research. Patients with incomplete medical records and under 18 years old were excluded from the experiment. Transplantations in children have stood out for the small rate - the number of diseases indicated for corneal transplantation in children is smaller than in adults. Data were presented in descriptive statistics as frequencies and medians. Data analysis was performed in SPSS software, version 23. The Institutional Research Ethics Committee approved the current study under CAAE protocol n. 91139418.2.0000.5065.

RESULTS

Age and Sex

Women accounted for 54.3% of the 1,310 assessed patients (Table 1). Therefore, there was slight prevalence of women among patients subjected to corneal transplants in Espírito Santo State/Brazil.

Patient age ranged from 18 years (minimum) to 95 years (maximum). Median age was 62 years, mean age was 57 years

Table 1
Distribution of patients subjected to cornea transplant in Espírito Santo according to sex.

Sex	Quantity	%
Women	711	54.3
Men	599	45.7
Total	1310	100

Table 2
Distribution of patients subjected to cornea transplant in Espírito Santo State regarding place of origin

	Absolute frequency	Relative frequency (%)
Vitória	179	13.7
Vila Velha	199	15.2
Cariacica	127	9.7
Serra	192	14.7
Guarapari	36	2.7
Viana	15	1.1
Fundão	3	0.2
Countryside	375	28.6
Other States	184	14.1
Total	1310	100

and standard deviation was 20 years. CNCDO/ES did not make available the classification by age group.

Sample distribution by city

Collected data (Table 2) have shown that 57.33% (751) of patients subjected to transplants in Espírito Santo State/Brazil are from Vitória Metropolitan Region. The other 72 cities were classified as State hinterlands, they account for 28.62% (375) of patients subjected to transplant.

State of origin

Espírito Santo is the state recording the highest frequency of patients subjected to cornea transplant registered in CNCDO in its region, which comprises 1126 patients (86%). Rio de Janeiro (RJ) State has frequency of 30 patients (2.3%), it is followed by Minas Gerais (MG) State, with 28 patients (2.1%) and Bahia (BA), with 25 patients (1.9%). The aforementioned states account for 92.3% of States of origin.

Diagnoses

Bullous keratopathy accounted for 25.9% of recorded diagnoses (Table 3), it was followed by keratoconus (16.5%) and interstitial keratitis (15.5%). These three pathologies accounted

Table 3

Diagnoses of patients subjected to cornea transplant in Espírito Santo State registered in the Notification, Procurement and Distribution of Organs Center

Diagnosis	Frequency	%
Bullous keratopathy	339	25.9
Keratoconus	216	16.5
Interstitial keratitis	203	15.5
Other corneal dystrophies	171	13.1
Leukoma of any etiology	117	8.9
Fuchs dystrophy	112	8.5
Secondary or late failure	81	6.2
Corneal degeneration	67	5.1
Eye burning	3	0.2
Congenital corneal anomalies	1	0.1
Total	1310	100.0

Table 4

Waiting time for cornea transplant, measured in days

Minimum	0
Maximum	1345
Median	111
Mean	195
Standard deviation	286

for 57.9% of all diagnoses registered by CNCDO in Espírito Santo State throughout the assessed period (Table 3).

DISCUSSION

The profile of patients subjected to corneal transplants in Espírito Santo State/Brazil showed slight prevalence of women. Studies performed in different reference centers for cornea transplant in Brazil somehow corroborate the current outcome,⁽¹¹⁻¹⁵⁾ however, there were times when the outcomes were not consistent - men have prevailed.⁽¹⁶⁻²⁰⁾ Mean age of assessed patients was 57 years, standard deviation was 20 years - this outcome is similar to findings in a research carried out with patients subjected to penetrating cornea transplant registered in the Eye Bank of Santa Casa de Misericórdia Hospital in São Paulo State/Brazil.⁽¹⁸⁾

Results in the current study showed the prevalence of patients from Vitória Metropolitan Region. According to studies, such a feature can be justified by the greater accessibility to

public health systems for diagnosis, treatment and monitoring of ocular pathologies by patients from the Metropolitan Region. It is important highlighting that 14% (184) of patients subjected to transplant in Espírito Santo State/Brazil are from other Brazilian States: Rio de Janeiro (RJ), Minas Gerais (MG), Bahia (BA), Federal District (DF), Rio Grande do Sul (RS), São Paulo (SP), Alagoas (AL), Goiás (GO), Paraná (PR), Rondônia (RO) and Rio Grande do Norte (RN).⁽²¹⁾ Such a finding shows that the aforementioned states cannot support the demand for transplants, a fact that overloads border states.⁽¹⁴⁾ In addition, Espírito Santo State/Brazil has shorter transplant waiting list than almost every other state in the country, except for Rio Grande do Sul (RS) and Paraná (PR). Espírito Santo State reported shorter transplant waiting list than these last two states in 2015, 2016 and 2018.⁽²¹⁾ According to Cruz et al., the geographic heterogeneity in cornea transplant occurrence is a public health issue. Based on such outcomes, it is possible noticing that eye health is not effectively contemplated by the doctrinal principle of regionalization guaranteed by the Unified Health System.⁽⁹⁾

Results in the current research showed that bullous keratopathy, followed by keratoconus and interstitial keratitis were the main indicative diagnoses for cornea transplant in Espírito Santo State. This outcome differs from studies conducted in Brazil, Latin America and Europa, where the main indicative diagnosis for cornea transplant is keratoconus.⁽²²⁾ It is important highlighting that divergence in outcomes between Espírito Santo and Brazil is not an isolated case, since Leukoma, followed by keratoconus and bullous keratopathy is the main diagnosis in Pernambuco State.⁽¹⁴⁾ This finding can be explained by the better quality of contact lenses used for vision correction, as well as by the use of intrastromal corneal ring,⁽²³⁾ which reduces the number of patients with keratoconus subjected to transplant. The main indications for cornea transplant can change depending on the assessed period, on the place where data were collected, on the age group of the assessed population, as well as on environmental and cultural factors.⁽⁹⁾

The following outcomes concern the waiting time set for patients subjected to corneal transplants: minimum waiting time of 0 days, maximum waiting time of 1345 days, median of 111 days, mean of 195 days, and standard deviation of 286 days. Mean waiting time changes greatly between different regions in Brazil, it ranges from 124 days in Pernambuco State to 694 days in Pará State. According to the Brazilian Transplant Register, Espírito Santo State reported estimated demand for 358 transplants and performed 301 transplants in 2017, thus reaching 84% of patients on the waiting list.^(14,15) Pará State reported the demand for 745 transplants and only performed 303 (40%). Such data can indicate the relationship among the consequences of delayed therapy, individual complications and chances of care and cure.⁽¹⁴⁾ On the other hand, Pernambuco State reported the demand for 847 transplants and performed 967 transplants, carrying out more transplants than expected.⁽¹⁵⁾

It is very important to know the epidemiologic profile of patients subjected to corneal transplants in order to identify risk groups and to outline prevention and care strategies in order to accomplish better prognosis.

CONCLUSION

Bullous keratopathy and keratoconus were the main eye diagnoses for cornea transplant indication in Espírito Santo State. Women and mean age of 57 years old prevail among transplant

patients. Patients are mainly from Vitória Metropolitan Region and originally from Espírito Santo State - the State is followed by Rio de Janeiro and Minas Gerais states. The waiting time in Espírito Santo State was heterogeneous. The current study pointed out some characteristics that can provide subsidies for prevention strategies, care effectiveness and better basis for social actions on tissue donation awareness.

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