

CORNEAL SPECULAR MICROSCOPIC ENDOTHELIAL EVALUATION OF DONORS OLDER THAN 70 YEARS IN AN EYE BANK FROM SERRA GAÚCHA

AVALIAÇÃO ENDOTELIAL MICROSCÓPICA ESPECULAR DE CÓRNEAS DE DOADORES COM MAIS DE 70 ANOS EM UM BANCO DE OLHOS DA SERRA GAÚCHA

EVALUACIÓN ENDOTELIAL MICROSCÓPICOS CÓRNEAS DE DONANTES ESPECULAR, CON MÁS DE 70 AÑOS EN UN MONTE DE BANCO DE OJOS GAUCHA

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ABSTRACT

Objective: To evaluate the count of endothelial cells / mm² of corneas from donors aged 70 years or older. **Method:** A quantitative retrospective documentary study with 71 corneas preserved from June to December 2016 in an eye bank from Serra Gaúcha. **Results:** Male gender predominated, 55% of deaths; The age range from 70 to 75 years was 61%, from 76 to 80 years was 39%; out of 71 collected corneas, 28.16% were used, 25,35% discarded serological reagent, one tissue (1.42%) was referred to anatomopathological tissue conditions after preservation and 45.07% expired after 14 days of preservation. **Conclusions:** Cornea donors aged 70 years or older have good endothelial counts / mm², being feasible for transplant, with cornea donors being motivated by life expectancy in the region.

Descriptors: Evaluation. Endothelial Microscopic. Cornea. Donors over Years.

RESUMO

Objetivo: Avaliar a contagem de células endoteliais / mm² de córneas de doadores com idade igual ou superior a 70 anos. **Método:** Estudo documental retrospectivo de caráter quantitativo com 71 córneas preservadas no período de junho a dezembro de 2016 em um banco de olhos da Serra Gaúcha. **Resultados:** Predominou o gênero masculino (55%) dos óbitos; a faixa etária de idade dos 70 a 75 anos foi de: 61%, dos 76 a 80 anos foi de 39%; de 71 córneas captadas houve aproveitamento de 28,16%; descartes por sorologia reagente somaram 25,35%, um tecido (1,42%) foi encaminhado para anatomopatológico pelas condições apresentadas após a preservação e 45,07% expiraram o prazo de 14 dias de preservação. **Conclusões:** As córneas de doadores com idade igual ou superior a 70 anos apresentam boa contagem endotelial / mm², sendo viáveis para transplantes, sendo a captação nestes doadores motivados pela expectativa de vida na região.

Descritores: Avaliação. Endotelial Microscópica. Córneas. Doadores com mais 70 anos.

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RESUMEN

Objetivo: Evaluar el recuento de células / mm² endoteliales de córneas de donantes mayores de 70 años. **Método:** Estudio retrospectivo documental de carácter cuantitativo con 71 córneas conservadas en el período de junio a diciembre de 2016 un banco de ojos de la Serra Gaucha. **Resultados:** El macho dominante, el 55% de las muertes; el rango de edad de edad de 70 a 75 años fue del 61%, pasando de 76 a 80 años (39%); 71 córneas fueron capturados utilización de 28.16%, las descargas de reactivo serología ascendió a 25,35%, un (1,42%) del tejido fue enviado a la patología de condiciones de los tejidos después de la conservación y el 45,07% fueron descartadas del plazo vencido 14 días de conservación. **Conclusiones:** Las córneas de donantes mayores de 70 años tienen buena endotelial / mm² contar, y viable para el trasplante, y para capturar estos donantes motivados por la esperanza de vida en la región.

Descriptor: Evaluación. Endotelial Microscopio. Córnea. Donantes con más de 70 años.

INTRODUCTION

The penetrating corneal transplant has been used since 1905, when the first successful procedure was done. However, there was'nt much human tissue available and the difficulties on this procedure have been the responsible hindrances for the reduction of this surgeries. The deficiencies of donors is still one of the main universal and contemporary obstacles when the hot topic is transplants.¹

The first semester of 2016 showed a decrease in the number of transplants, with exception of lung transplant.

Even though South region is'nt the most populous region, it has the highest donation rates per million; Santa Catarina (SC) holds the first place with 30,5 donors per million, followed by

Rio Grande do Sul (RS) and Paraná (PR).

From January to March, 3.471 corneal transplants have been made in Brazil, but there are still 11.090 adult patients and 554 pediatric patients in the waiting list.²

Even though cornea transplantation is the one that has grown the most in Brazil, the lack of tissue is fatified by the lack of donors and trained Eye Banks to provide high quality corneas in the needed amount to supply the demand.³

What is more prevalent and punctually observable is an immense concern about the risk of disease transmission through the graft, therefore, strict criteria are selected for donor selection. However, what should never be disregarded is that the age / quality ratio of the tissue is at the discretion of each Center for

Notification, Collection and Distribution of Organs (CNCDO), since the Ministry of Health Ordinance 2.600 accepts as donors patients aged 2 years or more and less than or equal to 80 years who do not offer risks of transmitting diseases through the donated graft.⁴

The motivation and necessity of the present study is based on daily experiences in the service of Eye Bank Lion Club São Pelegrino Pompéia Hospital, where a significant number of deaths of patients over 70 years old are observable.

Although it is the hospital where the Eye Bank is located, a reference for urgent and trauma emergency care for an estimated 1.2 million people, the number of monthly donations was reduced when the maximum age for donors of ocular tissues was reduced from 80 to 70 years by the Center for Notification, Capture and Distribution of Organs (CNCDO) of the state of Rio Grande do Sul, as established by the State Technical Chamber of Corneal Transplants in September 2014.

At the end of the study, we intend to establish a threshold age for donors of ocular tissues in the Eye Bank based on the analysis of the use of corneas obtained from donors over 70 years old, considering the new CNCDO

/ RS decision, which through a new opinion from the State Technical Chamber of Corneal Transplants transfers this autonomy to the Eye Banks individually to decide the maximum age for possible donors of ocular tissues, considering the variables and specificities of each region of the state.

METHOD

For the accomplishment of the proposed study we chose the documental procedure developed retrospectively and of quantitative character.

Documentary research is based on the collection of documented data as a basis of support and analysis. The collection of information is based on materials not yet submitted to any previous critical analysis. The retrospective approach leads to a scientific exploration of the past, respecting the delimitation of a period already past.⁵ With the conceptual appropriations of the reasoning of the epistemological-deductive method, researchers, based on their experiences in these object-local spaces of study, seek to base a conclusion based on the hypotheses previously formulated.⁶

In this study, 71 corneal tissues from donors older than 70 years were entered into an Eye Bank of Serra Gaúcha from June to December 2016, and the data were collected and analyzed in January of the following year. The choice of this service was welcomed here because it maintains a large philanthropic institution in the city of Caxias do Sul (RS), and, especially, because of its great national representativity regarding the donation of organs and tissues for transplants.

The inclusion criteria previously established were the following: preserved corneas of donors aged between 70 and 80 complete years and raised from June to December 2016; verification of all the documentation required according to the norms in force for carrying out the procedure - donation, including if the Free and Informed Consent Form; no clinical and / or serological indication for tissue preservation; of tissues with reagent serologies for the requested markers provided for in resolutions that have already been preserved; were donors enucleated by the professionals of the studied Bank of Eyes, regardless of the origin where it was; acceptance of ocular tissues from donors in cardiorespiratory arrest and / or encephalic death with registration of

donation notification with CNCDO / RS.

The tissues are classified into optics or tectonics according to the score received in the Luxvision slot model SL - 1400, with five stages of amplification from 6x to 40x; each item of the five layers of the corneal tissue receives a score with variable from 0 to 4, being: 0 "Excellent", 1 "Good", 2 "Regular", 3 "Bad" and 4 "Unacceptable". In the final evaluation factors of the donor's clinical history, such as age, cause of death, and counting of endothelial cells in Inconan's specular microscope, Kerato Analyzer, model EKA-98, which allows an image of the corneal endothelium. This feature is a differential, allowing the evaluator an objective measure of the number of cells / mm² per area, corroborating when it comes to punctuating and classifying the tissue. Such an evaluation allows the transplanter a better perspective for the transplant, as well as, recovery of the visual acuity of the patient. This information is archived electronically and printed on the service's own forms.

Data were analyzed through descriptive statistics and presented as tables to evidence endothelial cell count, quality and utilization of corneal

tissues collected in donors over 70 years of age.

The research project was evaluated and approved by the Research Ethics Committee of the proposing institution through Opinion No. 1,872,477, CAAE: 59641016.4.0000.5331, complying with the norm 466/12 regarding the ethical aspects of research with human beings.⁷

RESULTS

From June to December 2016, eye tissues from 123 donors came from the Eye Bank, of which 36 were included in the study because they were within the age range included in the inclusion criteria, totaling 72 eyeballs and 71 corneas preserved. We point out that, following the inclusion criteria, a cornea was excluded because of opacity and epithelial exposure in the visual axis, which was referred to pathology before preservation. A second tissue presented characteristics similar to the one described previously. However, it was included in the 71 corneas studied because it had undergone preservation and evaluation before being referred to anatomopathological due to epithelial exposure plus visual axis opacity.

Regarding the gender, there was a predominance of males with 55% of

deaths, the other 45% were females. The dominant age group was from 70 to 75 years (61%), and from 76 to 80 years represented 39%.

Of the total tissues collected there was a use of 28.16%, with 20 transplanted grafts. A total of 25.35% were discarded for presenting anti-HBc serological marker reagent, which represents antibody marker for hepatitis B; only 1.42% were referred to pathology because they presented opacity and epithelial exposure in the visual axis. The majority, for a total of 45%, was kept at the Eye Bank at the disposal of CNCDO / RS, observing the expiration and preservation period, which is 14 days in an appropriate liquid medium and in a refrigerated environment with temperature between +2 and +8 ° C. At the end of this period, the tissues were not available to receptors on the waiting list, they were sent to the pathology laboratory because of their expired validity.

Of the 71 corneal tissues obtained, the tectonic classification prevailed with 41 preserved corneas, versus 30 made available by the Eye Bank service to CNCDO / RS with optics classification.

Table 1- Final destination of tectonic tissues in an Eye Bank of Caxias do Sul / RS - January 2017

Destination	Cause	Average cel mm ²	Quantity	%
Discard	Anti HBc Reagent	2668,33 mm ²	10	24,39
Anatomopathological TX* in RS	Maturity	2592,00 mm ²	29	70,75
Anatomopathological	Opacity + Exposure	2958,33 mm ²	01	2,43
Total		2844,00 mm ²	01	2,43
		2756,17 mm ²	41	100

*TX = transplanted

Source: researchers' data

Of the 30 optical tissues available for transplantation, 19 corneas were harvested, which represents 63.33% of the sample, and 63.15% of these were transplanted by teams from Rio Grande do Sul and 36.85% used by teams from other states through a

national offer, indicated in this work by CNCDO.

Among the optical tissues, there were also discards by anti-HBc serological reagent and by maturity, as in tectonic tissues, but in smaller proportions as described in the data presented in table 2.

Table 2 – Final Destination of Optical Tissues in an Eye Bank of Caxias do Sul / RS - January 2017

Destination	Cause	Average cel mm ²	Quantity	%
Discard	Anti HBc Reagent	3054,16	8	26,67
Anatomopathological TX* in RS	Maturity	2943,33	3	10
CNCDO		2913,67	12	40
Total		2940,66	7	23,33
		2941,99	30	100

*TX = transplanted

Source: researchers' data

The donation process starts from the analysis of the hospital records of the donors and the evolution chart made by the nursing, considering the donor's medical history. The joint analysis of these factors account for almost 50% of tissue discards prior to preservation. After preservation, the main causes of discarding are biomicroscopic slit lamp evaluation and the serological reagent result for the requested markers provided for in current legislation.⁸ In

the present study, the data are antagonistic to the data explained above, since there was no disposal of ocular tissue in order of relation to the cause mortis or clinical history of the donor. This fact is closely related to the fact that these two stages are performed before enucleation, at which point all clinical and social contraindications of the donor are removed, through the analysis of the medical record, physical examination of the donor and the

collection of information from the previous life of the donor, deceased by interview with his family. Only after these steps does the Eye Bank professional perform the enucleation procedure.

These behaviors tend to guarantee greater security and reliability of the service, as well as, provide trained professionals to work 24 hours a day exclusively in the donation process.

As for the male gender overlapping the female, there seems to be almost unanimity among the studies in different regions of the country.^{1,9,10,11} One hypothesis for such an outcome may be related to external causes of death caused mainly by urban violence and polytrauma from traffic accidents.

With regard to the discards by positivity in serology for hepatitis B (anti-HBc antibody), this causes an impact on the lack of ocular tissues for transplants,^{1,11} considering that there is a low potential for infectivity in these cases.¹ The percentage of 25 , 35% of exclusive discards by anti-HBc reagent corroborates with previous studies. However, this index is close to that found in Rio Grande do Norte, where the positive serology for such marker reached 20.5% of the causes of tissue discards.¹⁰

According to the presented results it can be affirmed that in donors with more than 70 years of age, the tectonic classification predominates, a result very different from other national studies in which the optical classification predominated. However, such studies did not limit the sample in older donors, having a broad and comprehensive age range with younger age donors and even children.^{8,10,11}

The percentage of corneas classified as optic in older donors is significantly lower, as it is believed that the advanced age of the donor is related to a greater loss of endothelial cells.¹¹ The endothelial count, performed by specular microscope for eye bank is a differential . However, microscopy focused on the visual axis allows the evaluator an objective average number of cells / mm².⁸

Detailed evaluation of the endothelium is necessary because it is responsible for the maintenance of corneal dehydration and, therefore, for its transparency. This analysis is a determining factor to establish if this cornea has the premise of remaining transparent in the recipient. For a cornea to be released for the optic transplant, a minimum of 2,000 cells/mm² is necessary.⁸ In the Eye Bank of Pompéia Hospital Lions Club, where this study

was performed, the mean number of endothelial cells/mm² was 2.756.17 cells/mm² for tectonic tissues in donors older than 70 years, which suggests that poor tissue conditions may be related to the other layers of the cornea or to the donor's clinical conditions. Specular microscopy is a cell quantizer that does not replace the slit lamp that allows observation of endothelial cell appearance and all layers of corneal tissue.

We believe that such tissues are not conceived as theorizing for the traditional penetrating transplant, which is the one executed in a larger scale in the State of Rio Grande do Sul, but which may be useful for lamellar transplants, since this is already a reality, being the endothelial transplantation alone (DSEK), most commonly performed in Sorocaba, even in the face of high complication rates when compared to a penetrating transplant.¹²

CONCLUSIONS

The development of the present study enabled an analysis of the use of corneas from donors over 70 years of age. In addition to the aforementioned analysis, it was also possible to evaluate the count of endothelial cells that presented a number considered high,

since the prevalent trend is that such cells are lost over the years. Based on the endothelial cell evaluation is established at the São Pedro Lions Club of São Paulo Hospital Pompéia accepted from donors aged from 2 to 80 years old.

In this sense, corneas of donors older than 70 years present good endothelial cell count/mm² being feasible for transplants, motivating the capture in this type of donors in order to increase the high life expectancy in the southern region of Brazil. Therefore, we understand the relevance of the subject in order to bring relevant contributions to the development and improvement of surgical techniques related to transplants of donor corneas of more advanced age, as well as a more in-depth look at lamellar surgeries prioritizing their use and reducing the number of expiration of preserved corneas.

It is highlighted as limitations of the study the reduced number of other publications of similar segment with limitations of the sample in donors with more advanced age, thus allowing a reliable comparison with other regions of the country.

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