Trend Analysis of Organ and Tissue Donation for Transplantation

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ABSTRACT

Background. The goal of this study was to identify the tendency toward donations of tissue and organs from donors with brain death between 2001 and 2016 as registered by an organ procurement organization in São Paulo City.

Methods. This quantitative, retrospective, exploratory study encompassed all Tissue and Organ Donation Terms signed between 2001 and 2016. A logistic regression model was applied to verify whether there was an upward or downward trend in donation.

Results. After statistical analysis, a significant change trend was identified in skin, bones, valve, vessel, heart, lung, and pancreas donations, indicating an increase in the donation rate through the years. The donation rate did not show changes over the years for donations of liver, kidneys, and corneas.

Conclusions. The decision-making process regarding organ and tissue donation is restricted not only to the dilemma of whether to donate but another question then arises as well: which organs and tissues are to be donated? The discrepancy between the authorization for organ donation and the authorization for tissue donation, as well as the option for one or another organ and/or tissue, must be thoroughly examined because these factors directly affect the number of transplants and acquirements effectively accomplished. These factors may be related to explaining to one's relatives aspects of the surgery, body reassembling, and usage of such organs and/or tissues. They may also be related to the lack of knowledge concerning organ donation and the symbolism represented by the organ and/or tissue, among other factors.

THE FAMILY interview is defined as a meeting with the relatives of the potential donor and one or more professionals from the collection team, or other trained professional, to inform these relatives about the donation possibility. In this context, the family must decide whether they agree with the donation. A favorable manifestation implies, furthermore, in defining which organs and tissues may be extracted.

Heart, lung, liver, pancreas, and kidneys are organs used for transplant and present a higher social repercussion rather than the transplant of tissues such as corneas, sclera, cartilage, tendon, meniscus, fascia, valve, skin, blood vessels, bones, and amnion, which have therapeutic usage less known by people in general. Therefore, the present study sought to identify the tendency regarding donation of organs and tissues from donors with brain death that occurred between 2001 and 2016 in an organ procurement organization in São Paulo City.

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MATERIALS AND METHODS

This quantitative, retrospective, exploratory study was developed in an organ procurement organization in São Paulo City. The sample comprised all Tissue and Organ Donation Terms signed between 2001 and 2016.

After approval of the project by the ethics research committee of the unit, the data were collected and tabulated in an Excel spreadsheet for statistical, absolute, and percent analysis. For the purpose of verifying the existence of an upward or downward trend in donation, a logistic regression model was applied, assuming significant change in the donation rate when the P value is $<.001$. Later, the chance of donations over the years was identified, considering the odds ratio different from 1. Eventually, we sought to measure the accuracy of an odds ratio through the confidence interval. The narrower, the better is the estimated odd ratio in a general population.

RESULTS

A total of 1811 (100%) Tissue and Organ Donation Terms, signed in the period between 2001 and 2016, were analyzed. It was verified that liver and kidneys were authorized in 1806 (99.7%) and 1803 (99.5%) terms, respectively, corresponding to the highest percentage of donation authorization of the organs. Authorization for donation of hearts, lungs, and pancreas correspond to 1740 (96.7%), 1719 (94.9%), and 1712 (94.5%) terms.

Among the authorized tissue donation by the legal guardians, valves and cornea were authorized in 1557 (85.9%) and 1458 (80.5%) of cases, respectively; blood vessels, skin, and bones were authorized in 964 (53.2%), 775 (42.7%), and 737 (40.6%). The percentage of donation of organs and tissues over the years is presented in Fig 1.

After statistical analysis, a significant change trend was identified in skin, bones, vessel, valves, heart, lung, and pancreas donations ($P < .001$). In these cases, the odds ratio was higher than 1, indicating an increase in the donation rate through the period. Therefore, it can be interpreted that each year, the chance of skin, bones, valves, vessel, heart, pancreas, and lung donation increased by 4.8% [(1.048−1) * 100], 5.7%, 5.8%, 8.7%, 12.3%, 14.7%, and 16.3%, respectively.

For liver, kidney, and corneas, the test was not significant ($P > .05$); thus, we can say that their donation rate has not changed over the years.

DISCUSSION

Over the past decade, the specific organs donated varied; however, in recent years, the donation of heart, lungs, liver, kidneys, and pancreas has remained stable, equal or close to 100% of the signed consents.

It is interesting to note that among tissues, corneas and valves are in a transition zone and feature an approaching trend to percentages of donated organs. The consent regarding valves is more common because the extraction occurs only when the heart is not viable for transplant. On the other side, the donation of corneas has gained prominence due to the interest and commitment of public health policies associated with the role of the media concerning the importance of donation [1]. The donation of blood vessels, skin, and bones features strong resistance even among those who have a predisposition to donate.

It was noted that the use of bone grafts from orthopedic musculoskeletal tissue banks increased significantly due to the inability to obtain large quantities of autologous bone; there has been an increase in the number of orthopedic surgeries and development of new surgical techniques that rely on this tissue [2]. Nevertheless, the utilization rate of these grafts is still much lower than in the developed countries due to the unfamiliarity of the population

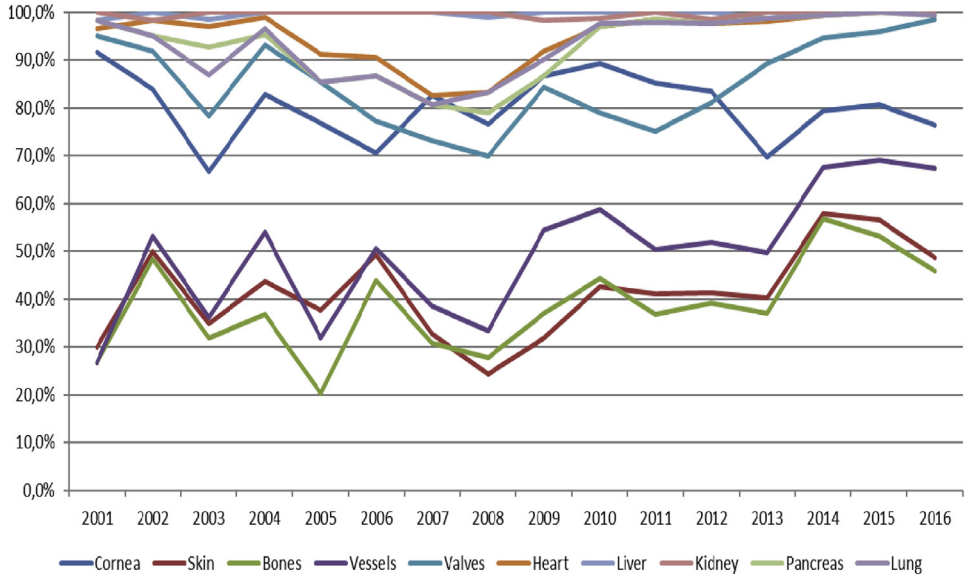

Fig 1. Percentage of organ donation in an organ procurement organization in São Paulo City, 2001 to 2016.

regarding the possibility of musculoskeletal donation, among other factors [3].

Research conducted by an Organ Search Service in São Paulo City showed that more than one-half of the families interviewed about the organ donation of their relatives (62.7%) did not receive a bone tissue donation request. Among households that received a request regarding donation of bone tissue, 92.9% did not receive information about the bones that would be removed, and 96.5% did not receive information regarding how the reconstitution of the body of the donor would be performed. Research shows that 60.7% of family members reported that they had not authorized the donation of bone tissue in order to preserve the appearance of the donor and 39.3% reported that they had not authorized it due to the lack of information as to what would be extracted and what the appearance of the donor would be [4].

The increasing demand of tissues for transplant necessitates the development of strategies to increase the number of potential tissue donors [5]. It is not noticeable that Tissue and Organ Donation Terms have changed in the State of São Paulo, as it was believed the checklist format was causing discomfort to the family and therefore negatively influenced the donation rates. This action was evaluated through a study which showed that the description of organs and tissues donated in the consent form did not provide a significant increase for the donation of tissues, except for corneas [6].

The statistical analysis performed provides evidence that the consent of heart, lung, and pancreas donations, among organs, and skin, bones, valves, and blood vessels, among tissues, presented a donation increase throughout 16 years.

Although the rate of refusal is singled out as one of the main causes of the lack of tissues [5], surprisingly, the donation of corneas remained stationary for more than a decade, whereas skin, bones, and vessels demonstrated low growth rates. These findings indicate that the educational measures and existing campaigns do not focus on these tissues and that strategies of approach remain ineffective.

The present study was not an exhaustive analysis of this subject; it was therefore limited to only 1 organ search service in Sao Paulo City. Nevertheless, it becomes important to conduct studies in other services and identify the reasons that lead a family to donate some organs and/or tissues and not others.

CONCLUSIONS

The decision-making process regarding organ and tissue donation is restricted not only to the dilemma of whether to donate but another question arises as well: which organs and tissues are to be donated? The existing discrepancy between the authorization for organ donation and the authorization for tissue donation, as well as the option for one or another organ and/or tissue, must be thoroughly examined because these factors directly affect the number of transplants and collection effectively accomplished. These factors may be related to explaining to the relatives aspects of the surgery, body reassembling, and the usage of such organs and/or tissues. They may also be related to the lack of knowledge concerning the possibility of organ donation and the symbolism represented by the organ and/or tissue, among other factors.

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