Cases of Brain Death and Organ Donation Rates in Eskisehir

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ABSTRACT

Brain death is defined as the irreversible loss of brain and brainstem functions, making organ harvesting legally possible. We have aimed to determine the current donation and harvesting rates in Eskisehir, Turkey to achieve further donation rates by improving the conditions.

We have analyzed the data of brain death cases from Eskisehir Osmangazi University Hospital and 2 state hospitals based on a time interval between 2013 and 2017. The evaluation of 113 cases of brain death revealed that organ harvesting could be performed in 25.7% of those cases, whereas organ donation was not approved in 74.3% of those deceased patients due to refusal of the legally responsible relatives. The results of a study carried out in Bursa as the first-ranked province in the Organ Donation List of Turkey in 2012 suggested that relatives permitted organ donation in only 34.6% of 79 brain death cases between 2007 and 2014, whereas that rate was 8.8% of 4.9 cadaver donations per million persons in Bursa, Turkey. A comparison between the results of Eskisehir and a neighboring province showed that lower rates of organ donation in Eskisehir may be caused by absence of a transplantation center in the province, therefore, putting the transplantation center of the university hospital into service will accelerate the rates of organ donation in Eskisehir.

BRAIN death is defined as the irreversible loss of brain and brainstem functions. It may develop as a result of many reasons while traumas and cerebral hemorrhage are the leading causes. Brain death is irreversible and the subject is legally recognized as dead at the time brain death is diagnosed [1]. In our country,the diagnosis process and organ donation procedures are carried out in accordance with Turkish Law No. 2238 under Harvesting, Storage, Grafting, and Transplantation of Organs and Tissues. The legislation regulates the diagnostic criteria and process of diagnosing, and multiple revisions of this legislation have been made since 1979. The most recent revision was made in 2014 and, accordingly, the diagnosis of brain death is established by a cooperative evaluation of a neurology or neurosurgery specialist and an anaesthesiology and reanimation specialist or an intensive care specialist [2].

Patients with chronic organ dysfunction may receive an organ donation from live donors or the patients in whom brain death is clinically diagnosed. The rate of organ donation from cadavers is very low in Turkey. On the contrary, Turkey is usually ranked in the upper countries with respect to the rates of organ donation from the live donors [3]. The reasons leading to family refusal and such low rates of consent for organ donation from cadavers may include: (1) limited cases of death from pulmonary and cardiac arrest, (2) confusion as to the difference between brain death and the comatose state, (3) lack of confidence in health care services, (4) the expectation of a miracle, (5) fear of organ smuggling, (6) low socioeducational level, and (7) sociocultural attitudes under religious suppression [4]. Therefore, relatives of the patient usually hold a negative attitude toward the consideration of organ donation and they prefer to postone the decision until cardiac death declaration. This tendency significantly decreases the rate of organ donation, and, in addition, the life and life quality of the patients with organ failure [5].

We aimed to evaluate the rates of organ donation and harvesting rates in an effort to improve the donation rates in our province.

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METHODS

We received approval from The Ethics Committee of Osman Gazi University with No. 16, dated May 15, 2018, for the study and retrospectively screened a total of 113 cases of brain death reported within a 5-year period between 2013 to 2017 by 1 university hospital and 2 state hospitals founded in our province. The following data was collected: (1) demographic features, (2) reason for brain death, (3) number of days until diagnosis of brain death, (4) organ donation status of the case, (5) number of days until harvesting, (6) the name of the harvested organs (if the organ was donated), and (7) the number of the days until cardiac arrest. Data were analyzed using SPSS Windows version 23.0 (IBM, Armonk, New York, United States) statistical software package. The frequencies and percentages were calculated and expressed in tables. The evaluation of the annual data was performed by Pearson χ^2 test.

RESULTS

In the study, we evaluated a total of 113 cases of brain death with a mean age of 56.8 years; 61.9% of the deceased patients were men. Harvesting was performed in 25.7% of the patients, whereas legal relatives of 74.3% patients did not permit organ donation (Table 1). Mean time to diagnosis of brain death and organ harvesting after receiving consent for organ donation was found to be 1.4 days. Mean time to cardiac arrest was 2.3 days for the cases in which the relatives did not permit organ donation (Table 2). The most common cause of brain death was subarachnoid hemorrhage (60.2%) while the other mortality factors were intracerebral hemorrhage, hypoxic brain injury, cerebrovascular infarction, and intoxications (Table 3). The cornea was the most commonly transplanted organ, and the liver was the second-most transplanted organ. The highest number of donations was 38.5% in 2016 compared with a donation rate of 34.8% in 2015 (Table 4).

DISCUSSION

We have analyzed the records of a total of 113 patients diagnosed with brain death between the years 2013 to 2017 who were reported by 1 university hospital and 2 state hospitals in our province. The data included demographic features, mortality factors of brain death, consent and refusal rates of the families, time to harvesting if donation was performed, names of the transplanted organs, and time to cardiac arrest if transplantation was not permitted. Of the patients analyzed, mean age at death was 56.8 years and the patients were predominantly male (61.9%). Battal et al [6] found similar results in their study on predominantly male patient cases of brain death with a mean age of 41 years; the most common reason for brain death was subarachnoid hemorrhage. Subarachnoid hemorrhage was the most common etiology of brain death in our study; however, different diagnoses were reported as the etiology of brain death compared with the study of Battal et al. This is because many cases of brain death were reported by various types of intensive care units in province-wide health care facilities.

Another retrospective analysis carried out in our country detected a mean age of 48 years among predominantly male patients and reported a mean time of 5 hours until harvesting after receiving consent from the patient's family. On the other hand, we have a mean time of 1.4 days between consent from the family until harvesting [7]. Kıraklı et al [7] obtained these results in an education and research hospital, which is available for transplantation. This research hospital was founded in a province with a 3-fold mean rate of donation compared with the mean rate of organ donation in the country of Turkey as a whole. Thus, harvesting of donated organs can be performed in a shorter time.

Karasu et al [2] evaluated the rates of brain death and donation in their study in a neighboring province of Eskisehir. Despite high similarities with respect to geographic and sociocultural aspects between our province and Bursa, consent rate for organ donation by the families was 34.2% in Bursa, whereas that rate was only 25.7% in our province [2].

Table 1. Organ Donor Status and Frequency of Organs

Donor Status and Organs	Frequency (n)	Percentage (%)
Organ donor status		
No	84	74.3
Yes	29	25.7
Organs		
Kidney	13	11.5
Liver	15	13.3
Cornea	16	14.2
Others	4	3.5

Table 2. Descriptive Statistics

Demographics/Donation Data		Frequency (n)	Percentage (%)	
	Male	70	61.9	
	Female	43	38.1	
Sex	n	Minimum	Maximum	Mean ± SD
Age, y	113	11	92	56.84 ± 19.08
Time to diagnosis, d	113	1	5	1.40 ± 0.69
Time to harvesting, d	20	1	7	1.40 ± 1.51
Time to cardiac arrest, d	94	1	11	2.30 ± 2.24

Table 3. Frequency of Etiology and Multiple Diagnoses

Etiologies and Diagnoses	Frequency (n)	Percentage (%)
Etiology		
Intracerebral hemorrhage	29	25.7
Subarachnoid hemorrhage	68	60.2
Intoxications	1	0.9
Hypoxic brain damage	15	13.3
Cerebrovascular infarction	15	13.3
Diagnoses		
Single	98	86.7
Multiple	15	13.3

Table 4. Organ Donor Status per Year Cross Tabulation

Year		Organ Donor Status, (%)		
		No	Yes	χ^{2*}
Year	2013	19 (90.5)	2 (9.5)	9.064; 0.060
	2014	14 (93.3)	1 (6.7)	
	2015	15 (65.2)	8 (34.8)	
	2016	16 (61.5)	10 (38.5)	
	2017	20 (71.4)	8 (28.6)	

*Pearson χ^2 test.

According to an analysis of The International Registry on Organ Donation and Transplantation database records, donor rate was 5.05 per million persons in 2013, whereas donation from live persons was 46.64 per million persons in our country [3]. According to the statistical data from the Republic of Turkey Ministry of Health, donation rate per million persons was 9.1 in Bursa [8]. The country-wide low rate of donation from cadavers explains the high rates of donation from live persons.

Kıraklı et al [7] suggested an important outcome that may clarify the difference with respect to rates of organ donation between 2 neighboring provinces. The lack of an experienced coordinator and absence of a transplantation center in Eskisehir at the time of this study have significantly negatively affected the statistical data related to donation rates.

CONCLUSIONS

The families have reported various rationales to refuse donation, and one of the most easily improvable rationales among those variables is the absence of an organ transplantation center managed by an effective and experienced coordinator. We have concluded that this difference between the donation rates of 2 neighboring cities with similar sociocultural characteristics within the same country results from a lack of knowledge on organ donation that can be improved by activating a transplantation center in Eskisehir.

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