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Research Article

Brain Death Statistics of Antakya State Hospital in Years between 2009 and 2013: A Retrospective Study

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Abstract: The purpose of our study is in assessing the brain-death notices that have occurred in Hatay Antakya State Hospital and in highlighting the changes that have taken place over a five-year period. Data from 82 patients who were diagnosed with brain death in the intensive care unit of Hatay Antakya State Hospital in the five-year period from 2009–2013 have been examined retrospectively. The age, sex, hospitalization diagnosis, Glasgow coma scale, acute physiology and chronical health evaluation 2 score, comorbidity estimates, the presence of traumatic brain injury, and the cause of brain death information on the patients were recorded.The most frequent cause of brain death was head trauma due to firearm injuries, at 38 patients. Traumatic brain injury was present in 56.3% of the cases. The number of brain-death notices reached its highest level in 2013, with 39 patients. Two patients became donors and gave their organs in the five-year period. Thirty-one out of 39 notices in 2013 were for Syrian patients. Our brain-death notices have increased due to regional factors over the last few years.
Keywords: Brain death, notices, Syrian patients

INTRODUCTION

Advances in organ transplantation in the last 20 years have increased the importance of brain-dead patients who are potential donors. Brain death is a clinical diagnosis in which all of the brain functions are lost completely and irreversibly, together with the brain stem [1, 2]. Loss of consciousness, an absence of brain-stem reflexes, and the presence of apnea are required for the diagnosis [3]. Brain death is a term which was first described in 1959 and which was standardized through the Harvard Criteria in 1968 [4]. Advances in organ transplantation have gained momentum in the last 10 years and important progress has been made with the support of the Ministry of Health of Turkish Republic. The purpose of our study is in assessing the brain-death notices that have occurred in Hatay Antakya State Hospital and in highlighting the changes that have taken place over a five-year period.

MATERIALS AND METHODS

After the approval of the local ethics committee, data from 82 patients who were diagnosed with brain death in the intensive care unit of Hatay Antakya State Hospital in the five-year period from 2009–2013 have been examined retrospectively. The documents were scanned electronically using hospitals' electronic archive. Brain-death diagnosis is determined through the consensus of a committee, consisting of anesthesia, cardiology, neurology, and neurosurgery specialists, according to the "Law on Organ and Tissue Taking, Keeping and Transplantation" dated May 29, 1979 with number 2238 in Turkey [5]. Patients with a resumption of the general coma state, with no brain-stem reflexes, and with a positive apnea test were evaluated in the brain-death diagnosis. Six patients were not included in the evaluation because of an inability to perform the apnea test due to hemodynamical incompatibility in this period. Mechanical ventilation, invasive blood pressure, and central venous pressure monitorization were applied to all patients. The age, sex, hospitalization diagnosis, Glasgow coma scale (GCS), acute physiology and chronic health evaluation 2 (APACHE II) score, comorbidity estimates, the presence of traumatic brain injury, and the cause of brain-death information on the patients were recorded.

Statistical analysis of the data was performed with the SPSS 16.0 statistics package program. Descriptive statistics are shown as mean ± standard deviation or median (minimum-maximum) for the continuous variables, and as case numbers (n) and a percentage (%) for the categorical variables.

RESULTS

The demographic data, GCS, APACHE II scores, comorbidity estimates, and traumatic brain-

injury proportion of the patients are shown in Table 1. Eighty-two patients were diagnosed with brain death in the five-year period and only two (2.4 %) patients donated organs. Twenty-four (29.3%) of the cases diagnosed as brain death were female and 58 (70.7%) of them were male. The youngest was 11 years old, the oldest was 76 years old, and the mean age was 34.8 years of age. The most frequent cause of brain death was head trauma due to firearm injuries, at 38 patients. Traumatic brain injury was present in 56.3% of the cases. Spontaneous subarachnoidal hemorrhage and intracerebral hemorrhage were the most frequent causes in non-traumatic incidents. In seven patients, brain death occurred after cardiopulmonary resuscitation. All brain-death diagnoses were made clinically, except for the two patients who were donors. The definitive diagnosis period recorded for brain death was 6.24±2.4 hours on average, and the time that elapsed from intensive care unit admission to brain-death diagnosis was recorded as 4.28±3.79 days on average.

Brain-death notices per year are shown in Fig. 1. The number of brain-death notices reached its highest level in 2013, with 39 patients. Two patients became donors and gave their organs in the five-year period. Thirty-one out of 39 notices in 2013 were for Syrian patients.

Table 1: Demographic data, GCS, APACHE II scores, comorbidities, and traumatic brain-injury proportions of the patients.

	Mean ± SD, n,%
Age	34.8±21.4
Sex (Female/Male)	24(29.3%) / 58(70.7%)
GCS	4.45±2.32
APACHE II score	23.4±12.2
Comorbidity	24.4 %
Traumatic brain injury	56.3 %

GCS: Glasgow coma scala, APACHE: Acute physiology and chronic health evaluation

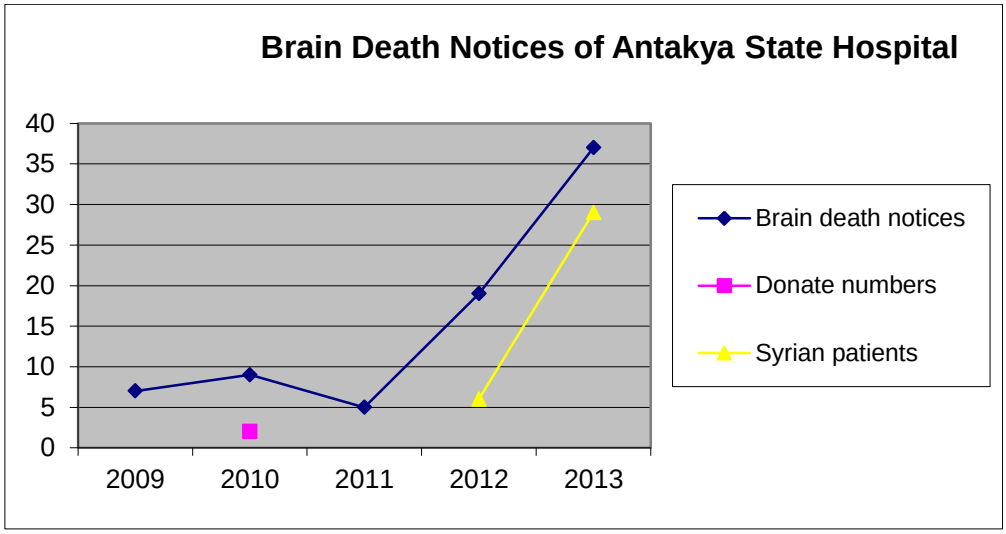

Fig. 1: Our brain-death notices between the years 2009–2013

DISCUSSION

The quick and correct diagnosis of brain death is an important responsibility both in medical and legal terms. The fact that patients with a brain-death diagnosis are potential donor candidates and that this is a beacon of hope for the many patients expecting help in this matter further increase the importance of this subject [6]. The brain-death notices increased in the last years under investigation due to an improvement in the quality standards of the intensive care units and advances in diagnostic technological possibilities. As the organ-donation rates are low in Turkey despite these advances, this matter has gained in importance. The highest donor rate worldwide is in Spain, with 33–35 donors per million of the population [7]. Considering the data for Turkey, there were 1478 brain-death notices countrywide in 2012 and 343 of them became donors (4.58 donors per million of the population and an acceptance rate of 23%). There were 1703 brain-death notices countrywide in 2013 and 379 of them became donors (4.72 donors per million of the population and an acceptance rate of 22%) [8]. When considering the brain-death notices per year, there has been a significant increase, especially in the last 2 years in Turkey. Our hospital takes top place in 2013 with 39 brain-death notices and 31 of these patients were Syrian patients. Since there is a war in Syria, which is close to Hatay, and the injured are treated in our hospital, the preexisting patient profile has changed, and this is reflected as an increase in the brain-death count. On the

other hand, people injured in the Syrian war and our brain-death cases who are Syrian citizens are not potential organ donors in a medicolegal or ethical sense, and this has increased our notice number and decreased the donor count. After the evaluation of all these data, only two (2.4%) patients out of 82 brain-death notices became organ donors, and this number is relatively very low.

In our study, the definitive diagnosis period for brain death was found to be 6.24±2.4 hours on average. In previous studies, it has been stated that the organ-donation acceptance rate decreases with an increase in this period [9, 10]. In our study, this period is consistent with the literature. In fact, the brain-death notifications do not show significant differences, except during the last two years. When we examined the Turkish origin brain-death cases by excluding the Syrian patients, the rate for becoming a donor was 2.4%, which is still very low. We think that the underlying cause of this situation is due to the social and cultural makeup of our area. Unfortunately, we do not have tangible data regarding this. This needs to be investigated further in future studies. A family interview is undertaken by organ-donation coordinators within the first 8 hours following the diagnosis having been made in all brain-death cases. However, as it was stated in the study by Kıraklı *et al*. [10], we think that this fast decision-making process could lead to negative results. One of the imperfections in our study involved not recording the acceptance and rejection motives for organ donation in detail.

After examining our cases, whilst trauma is the most frequent cause of brain death [11], it is in second place in our study. Again, brain injury due to firearm injuries is often the reason for that. Since there are more patients like this in war zones, these patients should have a more detailed physical examination in terms of brain death. Daily viewing of GCS scoring and routine organ-coordinator visits helped to identify these patients at an early stage in our hospital.

The general condition of the patient worsens rapidly when brain death has been detected. Consequently, diagnosis must be made quickly and tests must be performed rapidly in cases where brain death is suspected. Brain-death diagnostic tests could not be performed in six of our patients because of the delay during this period and the worsening of the hemodynamical values at an early stage.

CONCLUSION

Brain-death notices can alter across regions according to the time and the conditions in our country. Our brain-death notices have increased due to regional factors over the last few years.

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