ORIGINAL ARTICLE

Mapping and prediction of organ procurement in cases resulting in mortality due to traumatic injuries: A matched cohort analysis

Özgur Albuz, M.D.

Department of General Surgery, Keçiören Training and Research Hospital, Ankara-*Turkey*

ABSTRACT

BACKGROUND: The prediction of posttraumatic potential organ donors is a complex process. The aim of this study is to evaluate the organ procurement process in trauma-related injuries and determine the medical markers in organ donors and posttraumatic mortal patients at the first level emergency, in emergency surgical service, and surgical intensive care departments.

METHODS: In this retrospective study, after the approval of the ethics committee, the records of the patients in the emergency surgery unit, the operating room, and the organ donors in surgical intensive care unit between the years 2000 January–2011 December were examined. Patient demographics, distribution of donated organs, intubation area, transfer to the hospital, patient's service, trauma type, injury mechanism, and severity of the injury were examined. Continuous variables were evaluated with independent samples by the Student's t-test or Mann-Whitney U test and binary variables with the Pearson Chi-Square test. The patients who lost their lives and survived in the emergency department (ED) were compared with an age ratio of 1: 3. Final results were evaluated by multiple logistic regression.

RESULTS: The patients with ≤90 mmHg systolic blood pressure (SBP) or penetrant serious injuries were more likely to be candidates for organ donation in ED, respectively; 68.2% vs. 15.2% [AOR: 4.59 (1.14, 18.40), p<0.031] and 63.6% vs. 37.9% (AOR: 6.25 [1.27–30.49] [p<0.024]). Patients with AIS head ≥3 and in-hospital blood replacement of 1500 cc or more, were more likely to be organ donors after ED: 54.5% vs. 97% (AOR: 0.074 [0.014 kan0.548], [p<0.01]) and 10% vs. 58.1% (AOR: 0.098 [0.016–0.591], p<0.01]).

CONCLUSION: In terms of predictive traits for organ procurement, a SBP of ≤90 mmHg and presence of serious penetrant injuries were found to be more predictive for organ transplantation than other factors such as AIS Head ≥3 or 1500 cc or more replacement of blood and blood products.

Keywords: Level I emergency department; organ procurement process; predictive factors; posttraumatic deceased donors.

INTRODUCTION

A significant deficiency in the suitable organs for transplantation exists in the United States (US) nowadays.[1] Almost 91,000 cases of last stage organ failure are on the US organ transplantation waiting list.[2] The organ donation and transplantation society in the US maintains this list to ensure an effective change and better performance and quality. Organ transplantation still the only life-protective treatment for a lot of cases with organ failure.[3] While the frequency of organ donation has increased slightly in recent years, the growing prevalence of those waiting for transplantable organs has also increased.[4] The General Accounting Office first recognized the need for accurate and reliable estimates of donor potential at the regional level in 1993. The development of an adequate measure is essential in determining the effectiveness of an OPO (organ procurement organization).[5]

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Address for correspondence: Özgür Albuz, M.D.
Keçiören Eğitim ve Araştırma Hastanesi, Genel Cerrahi Kliniği, 06280 Ankara, Turkey
Tel: +90 312 - 356 90 00 E-mail: oalbuz@gmail.com

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From the first stage to the last stage, the donation and transplantation process is complex. It starts with the confirmation and maintenance of potential donors. Next, physicians inform the family about the patient's suspected brain death (BD), carry out tests to prove this diagnosis, and simultaneously notify the Organ Donation and Procurement Agency (CNCDO) to provide a potential donor.[6] Since the exclusion criteria for organ donation may vary from region to region, identification and referral of all potential organ donors to the local OPO for further evaluation is the main rule. Additionally, regulations of the medical services and centers state that all ventilator-dependent patients with severe brain injury must be referred to the local OPO before the termination of life-support measures. These steps must be done in collaboration with the intensive care unit (ICU), OPO personnel, and the transplant program staff.[7] The Board of Directors of the American College of Emergency Physicians (ACEP) adopted a policy that recognizes the requirement for organ and tissue donation and procurement, which highlights the key role emergency medicine (EM) can play in this process.[8]

Several policy issues plague the field of transplantation, most of which revolve around how to allocate this scarce and life-saving resource equitably. The main problem is access. Ethnic minority populations are affected disproportionately by end-stage organ failure but often need to wait significantly longer than Caucasians to receive an organ.[9] Economic and gender inequality are also points of concern.[10] Allocation issues would be considerably less difficult if more suitable organs were available. Proposals to increase organ availability include improving procurement effectiveness of hospitals and OPOs, increasing the willingness of the public to donate, enforcing presumed consent legislation, and providing financial incentives.[11]

In terms of the timing of organ procurement, unstable hemodynamic conditions most often characterize the timing between BD and the procurement of organs. These conditions must be expertly managed to maintain the viability and optimal condition of the organs.[12] The above-mentioned procedures along with timely hemodynamic management are the key to successful donor management. The primary purpose of the current study is to identify predictive factors of traumatic deceased patients who referred for a donation by the ED (emergency department), while the secondary purpose is to determine traumatic patient characteristics and perform mapping of the process of organ donation.

MATERIALS AND METHODS

Material

The conducted study is a single-center retrospective study of all patients admitted for organ procurement after trauma to Los Angeles County and University of Southern California (LAC–USC) Medical Center.

After institutional review board approval (10/31/2012), all consenting donors from 2000 January–2011 December were identified by the University of Southern California Medical Center Trauma, Surgical Critical Care, and Emergency Surgery registry. Between 2000 January–2011 December, 264 trauma patients were declared BD and they donated one or more organs. A total of 13 patients in this cohort study were excluded because relevant data for analysis could not be extracted from their medical charts.

Method

The primary measure was the identification of systolic blood pressure lower than 90 mmHg at admission. Secondary measures were the identification of the need of more than 1500 cc hospital blood replacement products (major transfusion), field intubation, assisted ventilation, and an AIS Head greater than or equal to 3.

Collection of Data and Statistical Method

The data examined included patient demographics (age, sex, race), organ procurement, field intubation, entry mode, admission site (ED, OR, ICU), mechanism of trauma, mechanism of injury, and injury severity and characteristics. Using the Pearson Chi-Square or Student's t-tests, we performed bivariate analyses to compare characteristics of organ procurement and assess differences between in ED deceased cases and non-ED deceased cases, using a ratio of 1:3 matching for age. Logistic regression was utilized to determine the independent predictors of organ procurement after ED admission.

RESULTS

Out of 264 patients that were examined in the study, the mean patient age was 31.78 years±15.68 years; 81.7% were male. The overall injury severity score was 31.18±12.19. The mean length of hospital stay from BD to organ procurement was 2.60±4.40 (0–40) days. The mean time of the initial vital signs time after admission was 1.13±2.88 (0–23) minutes. The assisted ventilation rate was 147 (58.6%) vs. 104 (41.4%). The highest field intubation was 64 (25.5%). Entry mode distributions EMS (Emergency Medical Services) with the ground were 216 (86.4%), EMS with airways were 25 (9.96%), cases transferred with family relatives were 6 (2.4%), and direct admissions were 3 (1.2%). When examining the trends of organ procurement distribution over time for ethnicity, the majority of organ procurement deceased cases were Hispanic (174 [69.3%]), followed by Caucasian (35 [13.9%]), Asians (19 [7.6%]), and African Americans (15 [6%]), and others (8 [3.2%]) (Table 1). The distribution of hospital phase rates in the trauma patients before organ procurement was 207 (82.5%) ICU, 28 (11.2%) ED, 9 (3.6%) OR, 4 (1.6%) ward, 3 (1.2%) (PICU-stepdown) others (Table 1).

Injury characteristics of traumatic organ procurement cases are presented in Table 2; GCS (Glasgow Coma Scale) less than

Table 1. Demographic characteristics of posttraumatic deceased cases for organ procurement

Characteristics	n=251	Percent
Age, mean±SD [range]	31.78±15.68 (3–88)	
Age ≥55% (#)	27	10.8
Male gender % (#)	205	81.7
The mean time of the initial vital signs time after admission	1.13 min ± 2.88 min (0–23 min)	
Ethnicity		
Hispanic	174	69.3
White	35	13.9
Asians	19	7.6
African Americans	15	6
Other	8	3.2
Arrive way		
Ground/EMS	216	86.4
Air/EMS	25	9.96
Other (direct admit-transferred with family relatives)/EMS	9	3.60
Field Intubation	64	25.5
Assisted ventilation	147	58.6
Prior phase before organ procurement process		
Intensive care unit	207*	82.4*
Emergency department	28	11.1
Operative room	9	3.50
Ward	4	1.60
Others	3	1.20

EMS: Emergency Medical Services; SD: Standard deviation; Min: Minimum.

Table 2. Injury characteristics of traumatic organ procurement cases

Characteristics	n	%
Injury mechanism		
Blunt	156	62.2
Penetration	95	37.8
Trauma mechanism		
Gunshot	95	37.8
Fall	41	16.3
Assault	14	5.6
Road accident (MVA + pedestrian – bike + motorcycle + motorbike)	91	36.2
Other	6	2.4
Unknown	4	1.6
ISS (mean±SD)	31.18±12.19	
ISS ≥16	240	95.6
GCS ≤8%	225	89.6
RTS ≥6	220	87.7
SYS ≤90 mmHg	47	18.7
Head >2	233	92.8
Abdomen >2	22	8.8
Chest >2	59	23.5
Subarachnoid hemorrhage (SAH)	63	25.1
Intracranial hemorrhage (ICH)	14	5.6

ISS: Injury severity score; GCS: Glasgow coma scales; SYS: Systolic blood pressure; RTS: Revised Trauma Score; SD: Standard deviation.

Table 3. Distribution of organ procurements for all patients depending on traumatic mortality between 2000 to 2011

Procured organ	Number of procured organs	%
Kidney	199	27.5
Liver	172	23.8
Heart	133	18.4
Pancreas	106	14.6
Lung	52	7.2
Eye	21	2.9
Tissue	36	5
Intestine and other	5	0.7

or equal to 8: 225 (89.2%) and SBP (systolic blood pressure) less than or equal to 90: 47 (18.9%). The injuries due to penetrating trauma were 95 (37.8%) and the injuries due to blunt trauma were 156 (62.2%). Detailed analysis of trauma distribution patterns consequently were gunshot: 95 (37.8%); pedestrian-bike accident: 50 (19.9%); fall: 41 (16.3%); motor vehicle accident: 34 (13.6%); assault: 14 (5.6%); motorcycle accident: 7 (2.8%); other: 6 (2.4%); or unknown: 4 (1.6%). In this cohort, subarachnoid hemorrhage (SAH) cases were 63 (25.1%) and intracerebral hemorrhage (ICH) were 14 (5.6%) (Table2).

In the distribution of organ procurements for all patients dependent on traumatic mortality between 2000 January–2011 December, when examining the trends of organ procurement rate over time, we fund that the rates in 2001 (11.9%), 2004 (10.5%), and 2005 (11.2%) were found to be higher than for other years (Table 4) (Fig. 1).

The total number of procured organs for transplantation was 724. Procured organs distribution were found to be 199 kidneys (27.5%), 172 livers (23.8%), 133 hearts (18.4%), 106 pancreas (14.6%), 52 lungs (7.2%), 36 tissues (5 %), 21 eyes (2.9%), 5 intestines, and others (0.7%) (Table 3) (Fig. 2). The mean organs procured per donor were 2.9.

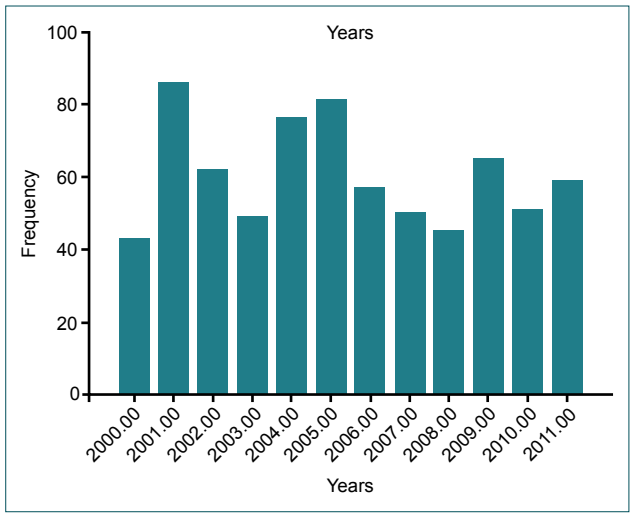

Figure 1. Total procurement frequency for organ transplantation between 2000 and 2011.

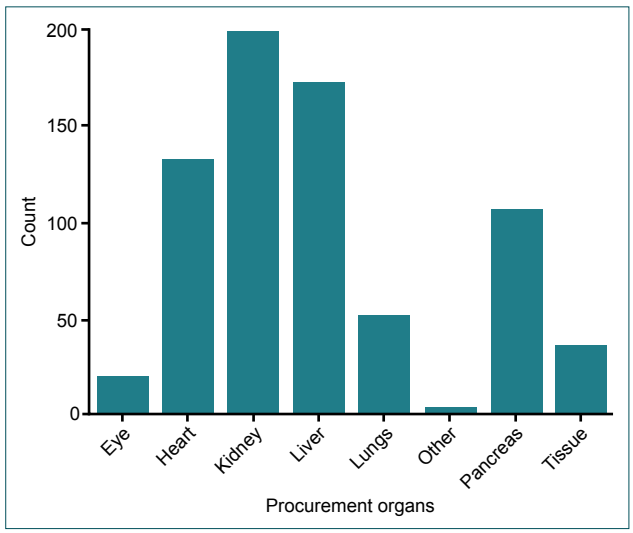

Figure 2. The distribution of procured organs for organ transplantation between 2000 to 2011.

In terms of mapping of organ procurement, when subgroup analysis was performed; it was observed that the first-procured organ for every year was the kidney. As an exception, in 2005 the number of livers procured was equal to the number of kidneys (Table 4) (Fig. 3).

The result of patient characteristics for a univariate cohort analysis on an age ratio of 1:3 between ED and non-ED cases were; ISS ≥16, SBP ≤90 mmHg, Head AIS ≥3, field intubation, and assisted ventilation were found significant among for prediction of the organ procurement candidates (Table 5). After 1:3 matching for age between overall mortality in ED and overall mortality in non-ED, adjusting for differences between covariates, patients with systolic blood pressure lower than 90 mm Hg in ED were more likely to be candidates for the organ procurement process as 68.2% vs. 15.2%, (AOR: 4.59 [1.14, 18.40] p<0.031) (Table 6). In contrast, patients with

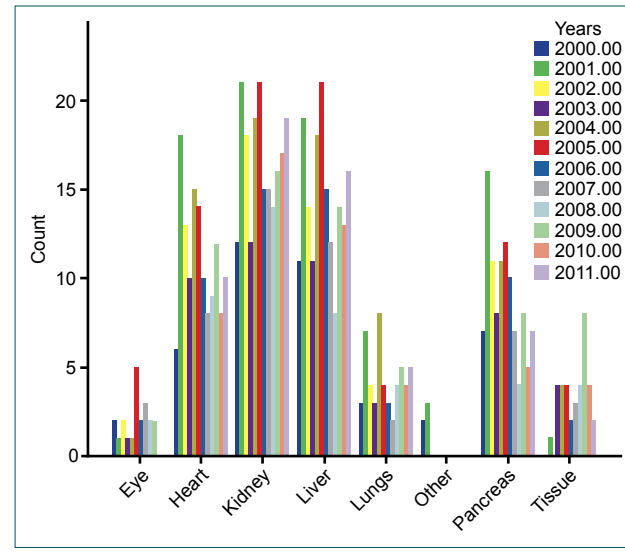

Figure 3. The distribution of procured organs for organ transplantation each year.

an AIS Head ≥3 and replacement of hospital blood products of 1500 cc or more were significantly less likely to be candidates for the organ procurement process in the ED; 54.5% vs. 97%, (AOR: 0.074 [0.014–0.548] [p<0.01]) and 10% vs. 58.1%, (AOR: 0.098 [0.016–0.591] [p<0.01]), respectively. On the other hand, the penetrant injury was found significant as 63.6% vs. 37.9% (AOR: 6.25 [1.27–30.49] [p<0.024]) (Table 7).

DISCUSSION

As of the time of the second world war, organ transplantation has been developing and increasing its effectiveness.[1,13] Organs can be procured from living donors and also from deceased donors. Although the rate is slow, the number of living donors has risen consistently but is almost exclusively restricted to the procurement of kidneys.[14,15]

Only a small proportion of all potential donors can donate. We know this because of the special donation conditions for deceased individuals. The availability of the donor is based on the relationship between the nature of the critical injury and the illness trajectory subsequent to it.[16] The course of organ procurement and protection of optimization is a complex effort. By its nature, organ procurement for organ donation has greater complexity than most other medical procedures. Organ procurement activation requires significant organizational, clinical, ethical, and social responsibilities. An institutional and individual sustainable encouragement is the cornerstone that identifies the possible potential organ donors and supplies increased organ donor candidates for acute care processes.[17] In light of this reality, this process needs enough time for successful procurement activation. Further, especially in the ED, the entire process can develop very quickly for the patient, patient family, and medical staff. Unfortunately, deaths in the ED are usually sudden, unexpected, and traumatic and

Table 4. Total procurement organ frequency and distribution from 2000 to 2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	n
Kidney	12*	21*	18*	12*	19*	21*	15*	15*	14*	16*	17*	19*	199
Liver	11	19	14	11	18	21*	15	12	8	14	13	16	172
Heart	6	18	13	10	15	14	10	8	9	12	8	10	133
Pancreas	7	16	11	8	11	12	10	7	4	8	5	7	106
Lung	3	7	4	3	8	4	3	2	4	5	4	5	52
Eye	2	1	2	1	1	5	2	3	2	2	0	0	21
Intestine and other	2	3	0	0	0	0	0	0	0	0	0	0	5
Tissue	0	1	0	4	4	4	2	3	4	8	4	2	36
Toplam, n (%)	43	86 (11.9)*	62	49	76 (10.5)	81 (11.2)*	57	50	45	63	51	59	724

Table 5. Patient characteristics of 1:3 matched cohort analysis for age between ED and non-ED cases

1:3 Matched cohort analysis with univariate analysis	(n=88)	Organ procurement process depending on ED phase mortality (n=22)	Organ procurement process depending on Non-ED phase mortality (n=66)	p
Age, mean±SD (range)	30.96±16.42 (16–75)	31.13±17.78 (16–79)	31.21±16.45 (16–78)	0.985
Age ≥55%, n (%)	12 (13.6)	3 (13.6)	8 (12.1)	0.85
ISS, mean±SD (range)	30.21±12.73 (1–75)	29.40±18.30 (1–75)	30.65±10.89 (10–75)	0.765
ISS ≥16, n (%)	83/88 (94.3)	18/22 (81.8)	65/66 (98.5)	<0.013
GCS ≤8%, n (%)	81/87 (93.1)	22 (100)	59 (90.8)	0.33
RTS ≤6, n (%)	79/85 (92.9)	22 (100)	57 (90.5)	0.33
SYS ≤90 mmHg, n (%)	25 (28.4)	15 (68.2)	10 (15.2)	<0.001
Male gender, n (%)	80 (90.9)	20 (90.9)	60 (90.9)	0.576
Head AIS ≥3, n (%)	76 (86.4)	12 (54.5)	64 (97.0)	<0.001
Chest AIS ≥3, n (%)	22 (25)	8 (36.4)	14 (21.2)	0.16
Abdomen AIS ≥3, n (%)	6 (6.8)	2 (9.1)	4 (6.1)	0.64
Field intubation, n (%)	33 (39.8)	14 (63.6)	19 (31.1)	<0.008
Assisted ventilation, n (%)	59 (67.0)	19 (86.4)	40 (60.6)	<0.026
Hospital blood product ≥1500 cc, n (%)	38 (46.3)	2 (10)	33 (58.1)	<0.001
Penetrant injury, n (%)	39 (44.3)	14 (63.6)	25 (37.9)	<0.035

AIS: Abbreviated injury score; GCS: Glasgow coma scales; ISS: Injury severity score; SYS: Systolic blood pressure; ED: Emergency department; SD: Standard deviation.

Table 6. Results of multiple logistic regression and the prediction of patients whose organs were procured for organ transplantation

Effect of systolic blood pressure over deceased case rates from ED	All patients (n=88)	Organ procurement process depend on ED phase mortality (n=22)	Organ procurement process depend on Non-ED phase mortality (n=66)	p value	Adjusted OR (95% CI)	Adjusted p value
SYS ≤90 mmHg	28.4% (25)	68.2% (15/22)	15.2% (10/66)	<0.001	4.59 [1.14–18.40]	<0.031

Logistic regression performed; adjusting for differences in ISS >16, GCS ≤8, head ≥3, systolic blood pressure ≤90 mmHg, field intubation, assisted ventilation, hospital blood replacement ≥1500 cc, penetrant injury. ISS: Injury severity score; SYS: Systolic blood pressure; ED: Emergency department; OR: Odds ratio.

usually involve young patients. Under these conditions, the coordination between the emergency physician and OPO can convert a life lost at the ED into a source of light for candidates waiting for transplantation.[18] The Board of Directors

Table 7. The results of the logistic regression for independent predictors of organ procurement and the dependent process

Secondary outcomes	All patients (n=82)	Organ procurement process depend on ED phase mortality (n=22)	Organ procurement process depend on Non-ED phase mortality (n=66)	p value	Adjusted OR (95% CI)	Adjusted p value
AIS head ≥3	76	54.5% (12/22)	97.0% (64/66)	0.001	0.074 (0.014–0.548)	<0.01
Hospital blood products ≥1500 cc	38	10% (2/20)	58.1% (36/62)	0.001	0.098 (0.016–0.591)	0.012
Penetrant injury	39 (44.3%)	14 (63.6%)	25 (37.9%)	<0.035	6.25 (1.27–30.49)*	0.024

Logistic regression performed; adjusting for differences in ISS >16, GCS ≤8, AIS Head ≥3, systolic blood pressure ≤90 mmHg, field intubation, assisted ventilation, hospital blood replacement ≥1500 cc, penetrant injury. ED: Emergency department; AIS: Abbreviated injury score; OR: Odds ratio.

of the ACEP has declared a policy that recognizes the requirements for organ and tissue donation and procurement, which highlights the role the EM can play in this process.[19] In 1998, Olsen and colleagues had underlined that the procurement of organs from deceased cases in the ED seldom takes place in the ED.[20]

Additionally, if the right timing for the patient consent is taken into consideration along with the maximization of organ donation and transplantation, a sufficient explanation about the process should be provided to the family members who will decide the organ procurement instead of the post-traumatic unconscious patient. The success of such a complex process requires a highly specialized critical care staff.[7] The first 24 hours for a patient who is received in the ICU due to major trauma are important in the success of the organ procurement process. The reason for the early prediction of a donor for trauma patients is important to achieve successful donation rates among patients referred from the ED or ICU on the first day. Unstable hemodynamic conditions most often characterize the process between BD and the procurement of organs.[7] In terms of keeping the viability and optimal condition of the organs, these conditions must be addressed and managed.[12] As a result, punctual hemodynamic management is the main principle of successful donor management.[7] While our results suggest that a lower SBP (≤90 mmHg) is a significant distinctive predictor of mortality among traumatic deceased patients who are referred from the ED for donation, we also suggested that a higher AIS for head (≥3) is also a distinctive predictor of mortality among traumatic deceased patients referred within the first 24 hours for donation. We believe that this prediction is important in the need for available organs in terms of providing enough time. In terms of the cadaver-related organ transplant, male donors cater to the majority of transplanted organs,[1] which is dependent on the increased incidence of traumatic death among males than females, which in turn has led to a greater number of potential male organs for transplantation.[21] When examining the trends of cadaveric organ donation in terms of gender (Table 2), there was no difference in the literature for our 12-year study period (male 81.7% vs. female 18.3%). The racial differences in organ donation of our study, when compared with the racial differences in other studies, were lower in terms of organ donation among deceased cases. Additionally, a lower rate of acceptance of donated organs was found between African Americans and Asians referred for organ donation (Hispanic 69.3% vs. Caucasian 13.9% vs. Asian 7.6% vs. African American 6% vs. 3.2% others) (Table 2). It is clear that much work remains to be done in overcoming social, economic, and racial obstructions to transplantation.[22–26] The lower rate of organ donation for African Americans and for Asians may depend on a number of factors, including increased rates of medical comorbidity and a customary general mistrust of the medical establishment.[25,27–29]

According to data from the Organ Purchasing and Transport Network in 2017, 5,800 people died while waiting for organs.[30] The most effective and feasible treatment option for those with end-stage organ failure is organ transplantation. Patients being females, Caucasians, and patients with higher education and higher income levels were determined as positive predictions/correlations for organ donation.[31–33] For this reason, it is very important to convince the family by putting up the patients as a donor candidate after trauma. In the triage of traumatic cases to detect candidates for the organ procurement process, the below values of SBP greater than 90 mmHg and penetrative traumatic injuries to the victim may be the cornerstone for resolving this issue (Table 6). Furthermore, if systolic pressure is not lower than 90 mmHg, the factors of AIS Head ≥3 and1500 cc and more replacement of blood products may play a role (Table 7).

In terms of timing of salvageable organs and consent for organ donation, the process of organ procurement activation must be done carefully under the guidance of trauma severity and other predictive markers.

Conclusion

In the ED, the detection of potential organ donors is dependent on an increased likelihood of successful prediction of mortality. Conversely, there is limited time for the organ pro-

curement process. While predicting potential organ donors from the ED, the detection of blood pressure lower than systolic 90 mmHg or presence of penetrant injuries may be significant.

Additionally, both the AIS Head score ≥3 and\or given 1500 cc or more blood replacements may be helpful to detect candidates for the organ procurement process after the ED phase. Further prospective and multi-center studies will be beneficial to improve these predictive markers for detection of the organ procurement candidates after injury.

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ORİJİNAL ÇALIŞMA - *ÖZET*

Travmatik yaralanmalara bağlı mortaliteyle sonuçlanan durumlarda organ alımlarının haritalanması ve tahmini: Eşleşmiş kohort analizi

Dr. Özgur Albuz

Keçiören Eğitim ve Araştırma Hastanesi, Genel Cerrahi Kliniği, Ankara

AMAÇ: Travma sonrası potansiyel organ bağışçıların öngörüsü karmaşık bir süreçtir. Bu çalışmadaki amaç düzey I acil cerrahi, travma ve cerrahi yoğun bakım merkezlerinde on sene boyunca travmaya bağlı yaralanmalardaki mortal seyreden hastalardaki organ tedariği sürecini değerlendirerek travma sonrası mortal sonuçlanan hastalardaki organ bağışındaki tıbbi belirteçleri ortaya koymaktır.

GEREÇ VE YÖNTEM: Geriye dönük olarak planlanan bu çalışmada etik kurul onayını takiben, acil cerrahi ünitesinde, ameliyathanede ve cerrahi yoğun bakımda organ bağışçısı olan hastaların 2000–2011 yılları arasındaki kayıtları incelendi. Hasta demografileri, bağışlanan organların dağılımları, entübasyon sahası, hastaneye nakil şekli ile hasta yakınlarının organ bağışını kabulleri esnasında hastanın bulunduğu servis, travma türü, yaralanma mekanizmasıyla şiddetleri incelendi. Sürekli değişkenler bağımsız gruplarda student t-test veya Mann-Whitney U-testiyle, ikili değişkenler Pearson ki-kare testiyle değerlendirildi. Acil serviste (AS) hayatını kaybeden ve kaybetmeyen olgular yaş bakımından 1: 3 eşleştirmeyle kıyaslandı. Sonuçlar çoklu lojistik regresyonla değerlendirildi.

BULGULAR: Sistolik kan basıncı (SKB) 90 mmHg'nin altındaki hastalarla, penetran travma olguları AS'ye organ bağışı adayı olma olasılıkları çok daha yüksektir. Sırasıyla (%68.2 ve %15.2, AOR: 4.59 [1.14, 18.40] [p<0.031]) ve %63.6 ve %37.9 (AOR: 6.25 [1.27–30.49] [p<0.024]). Beyin travması açısından AIS ≥3 olmasının ve 1500 cc veya daha fazla hastane kan ürünleri replasmanı yapılan olgularda AS sonrası organ bağışçısı olma olasılıkları daha yüksektir (%54.5 ve %97, AOR: 0.074 [0.014–0.548] [p<0.01]) ve (%10 ve %58.1, AOR: 0.098 [0.016-0.591], [p<0.01]).

TARTIŞMA: Travma sonrası potansiyel organ vericileri belirlemede acil servise kabulde SKB'nin 90 mmHg altında olması ve ciddi penetran hasarlanmalar, beyin travması hasar skoru (AIS ≥3) ve 1500 cc üzeri kan ve kan ürünü replasmanlarına göre potansiyel donörlerin belirlenmesinde daha öngördürücüdür.

Anahtar sözcükler: Düzey I acil servis; organ tedarik süreci; öngörücü faktörler; travma sonrası ölen organ bağışçısı.

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