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Emergency department referral for organ donation: more organ donors and more organs per donor

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Abstract

BACKGROUND: This study sought to determine whether early referral from the emergency department (ED) would increase the number of organ donors and the number of organs transplanted per donor (OTPD).

METHODS: This is a retrospective cohort analysis of all patients referred to a single organ procurement organization for a period of 60 months.

RESULTS: Patients referred for organ donation evaluation from the ED were more likely to become organ donors than patients referred from the intensive care unit (19.3% vs 5.2%, $P < .001$). ED referrals had a greater number of OTPD than those referred from the intensive care unit (mean 3.79 vs 3.16, $P = .024$), even after adjusting for the higher proportion of ED referrals who were trauma patients ($P = .001$).

CONCLUSIONS: Referral for organ donation from the ED is associated with an increased likelihood of organ recovery and with an increased number of OTPD.

Organ transplantation is well known to extend functional life and improve quality of life and has been demonstrated to be cost effective.[1] Access to this effective treatment is limited because of the lack of transplantable organs nationwide. Nearly 119,000 patients are currently waiting for an organ transplant. In 2012, there were 28,051 transplants performed, 79% of them from deceased organ donors.[2] Each year, 6% of patients waiting for an organ transplant die on the waitlist and another 4% are removed from the waitlist when they become too sick to undergo transplant surgery.[1] Organ procurement organizations (OPOs), donor hospitals, transplant centers, and in the United States, the Organ Procurement and Transplantation Network are attempting to address the organ shortage on 2 fronts, by increasing the number of organ donors and by increasing the number of transplantable organs recovered from each donor.[3]

Most potential organ donors are referred from critical or ICUs.[4] However, several studies have shown the importance of the emergency department (ED) as an underused source of potential donors. These studies have found that ED patients often were not identified as potential donors[5–8] and that educating ED staff to recognize referral triggers increased the donation outcomes of these units.[9]

Michael and O'Connor[4] compared donation outcomes after referral from the ED to donation outcomes after referral from

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an inpatient unit (usually an ICU). In their 2009 study, they found that patients referred from the ED were significantly more likely to be organ donors than ICU-referred patients even after controlling for mechanism of injury, age, and race. They attributed the higher rate of ED donation to earlier identification and referral allowing earlier OPO involvement, more time for family decision making, and identification of potential donors with fewer comorbidities.

An unexplored question is whether the number of OTPD is affected by the unit the patient was in at the time of referral. Our hypothesis was that patients referred from the ED would be more likely to become organ donors than patients referred from ICU and would result in a greater number of OTPD.

Methods

A retrospective cohort analysis was performed of all patients referred to a single OPO, Pacific Northwest Transplant Bank (PNTB), for a period of 60 months. PNTB's designated service area includes 81 hospitals in Oregon, southwest Washington, and southwest Idaho. The study population included all patients referred to PNTB for internal organ donation between July 1, 2007 and June 30, 2012.

PNTB's electronic databases were queried to identify the patient cohort and study variables. The analysis included patient demographics, date and time of admission and referral, consent outcome, origin of referral (ED or ICU), mechanism of injury, and for those patients who became donors, number of organs donated. The primary outcome was donation. The probabilities of a subject being an organ donor were compared between groups using logistic regression. The number of organs recovered per donor was analyzed using Poisson regression. Statistical significance was established at the P less than .05 level. Statistical analyses were conducted using R.[10]

A secondary subgroup analysis was conducted with only those patients deemed medically suitable potential donors by PNTB. This secondary analysis, conducted using the same statistical methods as described earlier, enabled examination of consent rates and other factors associated with converting potential donors into actual donors.

This study was approved by the Legacy Health System institutional review board and conformed to the tenets of the Declaration of Helsinki.

Results

The cohort consisted of 7,437 patients with 243 patients referred from the ED and 7,194 referred from the ICU. Of the 7,437 patients referred, 557 (7.5%) were determined by PNTB to be medically suitable for donation and 420 (75.4% of potential donors, 5.6% of all referred patients) became internal organ donors.

The demographics of the patients referred from the ED did not differ from those referred from the ICU in age, sex, or race but did differ in injury type, as shown in Table 1.

Among all patients referred for organ donation, those referred from the ED were determined to be potential organ donors more frequently than those patients referred from the ICU (23.5% vs 6.9%, $P < .01$) and were more likely to become organ donors (19.3% vs 5.2%, $P < .01$). Trauma patients referred from the ED were more likely to become donors than trauma patients referred from an ICU (36.7% vs 17.0%, $P < .01$). Among medically suitable potential donors only, ED-referred patients trended slightly toward being more likely to become donors, but the difference was not statistically significant (ED 78.3% conversion rate vs ICU 74.6% conversion rate, $P = .20$). Emergency department referrals trended toward higher probability of consent being given (ED had a 64.9% consent rate and ICU had a 54.8% consent rate), but again, it was not found to be

Table 1 Cohort demographics and injury type by unit of referral

	Overall (n = 7,437)	ED (n = 243)	ICU (n = 7,194)
Age, y, mean (SD)	54.74 (19.2)	49.39 (20.6)	54.92 (19.1)
Sex, n (%)			
Female	2,933 (39.4)	74 (30.5)	2,859 (39.7)
Male	3,995 (53.7)	151 (62.1)	3,844 (53.4)
Not available	510 (6.9)	18 (7.4)	491 (6.8)
Ethnicity, n (%)			
White	6,252 (84.1)	204 (84.0)	6,048 (84.1)
Hispanic/Latino	370 (5.0)	13 (5.3)	357 (5.0)
Asian	170 (2.3)	6 (2.5)	164 (2.3)
Black or African American	164 (2.2)	1 (.4)	163 (2.3)
Native American	42 (.6)	0 (.0)	42 (.6)
Middle Eastern	31 (.4)	1 (.4)	30 (.4)
Unknown	408 (5.5)	18 (7.4)	390 (5.4)
Injury type, n (%)			
Trauma	886 (11.9)	90 (37.0)	796 (11.1)
Nontrauma	6,551 (88.1)	153 (63.0)	6,398 (88.9)

ED = emergency department; ICU = intensive care unit.