Impact of Compliance with the American College of Surgeons Trauma Center Verification Requirements on Organ Donation-Related Outcomes

Darren J Malinoski, MD, FACS, Madhukar S Patel, SCM, Stephanie Lush, RN, MSN, M Lynn Willis, MHA, Sonia Navarro, Danielle Schulman, MPH, Tasha Querantes, MBA, Ramona Leinen-Duren, Ali Salim, MD, FACS

BACKGROUND: In order to maximize organ donation opportunities, the American College of Surgeons (ACS) requires verified trauma centers to have a relationship with an organ procurement organization (OPO), a policy for notification of the OPO, a process to review organ donation rates, and a protocol for declaring neurologic death. We hypothesized that meeting the ACS requirements will be associated with improved donation outcomes.

STUDY DESIGN: Twenty-four ACS-verified Level I and Level II trauma centers were surveyed for the following registry data points from 2004 to 2008: admissions, ICU admissions, patients with a head Abbreviated Injury Score ≥ 5, deaths, and organ donors. Centers were also queried for the presence of the ACS requirements as well as other process measures and characteristics. The main outcomes measure was the number of organ donors per center normalized for patient volume and injury severity. The relationship between center characteristics and outcomes was determined.

RESULTS: Twenty-one centers (88%) completed the survey and referred 2,626 trauma patients to the OPO during the study period, 1,008 were eligible to donate, and 699 became organ donors. Compliance with the 4 ACS requirements was not associated with increased organ donation outcomes. However, having catastrophic brain injury guidelines (CBIGs) and the presence of a trauma surgeon on a donor council were associated with significantly more organ donors per 1,000 trauma admissions (6.3 vs 4.2 and 6.0 vs 4.2, respectively, $p < 0.05$).

CONCLUSIONS: Although the ACS trauma center organ donation-related requirements were not associated with improved organ donor outcomes, involvement of trauma surgeons on donor councils and CBIGs were and should be encouraged. Additionally, incorporation of quantitative organ donation measures into the verification process should be considered. (J Am Coll Surg 2012; 215:186–192. © 2012 by the American College of Surgeons)

The shortage of organs available for transplantation continues to be a public health crisis. As of November 2011, there were more than 112,000 patients on the Organ Procurement and Transplantation Network (OPTN)/United Network for Organ Sharing (UNOS) waiting list and only 28,000 transplantations were performed in the last year.[1] One of the contributing factors to this gap between needed and available organs is a static number of deceased organ donors over the past several years.[1] However, when one considers that more than 75% of families consent to organ donation when approached by an appropriate requestor (Organ Procurement and Transplantation Network data January 2008 to June 2010)[1] and that approximately 41% of the adult population in the United States is currently registered to be an organ donor on a state registry,[2] it is evident that the desire to donate organs is prevalent in both our patients and their families.

Disclosure Information: Nothing to disclose.

Supported, in part, by the National Institute of Diabetes and Digestive and Kidney Diseases grant number 5RO1DK079667. Additionally, this work was supported in part by Health Resources and Services Administration contract 234-2005-37011C. The content is the responsibility of the authors alone and does not necessarily reflect the views or policies of the Department of Health and Human Services, nor does mention of trade names, commercial products, or organizations imply endorsement by the US Government.

Abstract presented at the Pacific Coast Surgical Association 82nd Annual Meeting, Scottsdale, AZ, February 2011.

Received December 8, 2011; Revised February 2, 2012; Accepted March 7, 2012.

From the Department of Surgery, Cedars-Sinai Medical Center (Malinoski, Schulman, Salim) and OneLegacy (Navarro, Leinen-Duren, Querantes), Los Angeles, CA; and the Department of Surgery, University of California Irvine (Patel, Lush, Willis), Orange, CA.

Correspondence address: Darren J Malinoski, MD, FACS, Cedars-Sinai Medical Center, 8635 West 3rd St, Suite 665w, Los Angeles, CA 90048. email: darren.malinoski@cshs.org

ISSN 1072-7515/12/$36.00
http://dx.doi.org/10.1016/j.jamcollsurg.2012.03.011

Abbreviations and Acronyms

ACS = American College of Surgeons
AIS = Abbreviated Injury Score
CBIG = catastrophic brain injury guideline
DCDD = donation after cardiac death
DNDD = donation after neurologic determination of death
OPO = organ procurement organization

In order to respect and carry out these wishes as well as to help alleviate the shortage of organs available for transplantation, the Revised Uniform Anatomical Gift Act requires organ procurement organizations (OPOs) and donor hospitals to have the necessary policies and procedures in place to preserve the option of donation for all patients and their families.[3] Furthermore, given that the majority of organs procured for transplantation are obtained from donors after neurologic determination of death (DNDD, revised terminology for "brain death"), trauma patients with catastrophic brain injuries represent an important group of potential donors. In an effort to maximize donation opportunities, the American College of Surgeons (ACS) qualitatively evaluates each hospital's organ donation practices during the trauma center verification process.[4] Specifically, the ACS requires verified trauma centers to:[4] establish a relationship with an OPO; develop policies and clinical triggers for notification of the OPO about patients with the potential for neurologic death; have a formal process to review organ donation rates; and implement protocols for the declaration of neurologic death. No study to date has evaluated the impact of meeting these requirements on outcomes.

Given this, the objectives of this study were to evaluate the impact of these current qualitative requirements on organ donation-related outcomes in order to ascertain if they should be considered sufficient for trauma center verification; to determine if there are other trauma center process measures and characteristics that are associated with improved outcomes; and to identify quantitative, as opposed to qualitative, measures of trauma center performance that may be more appropriate in evaluating each trauma center's performance related to preserving the option of donation for their patients and families.

METHODS

A survey study was conducted of all Level I and Level II trauma centers in the 7-county greater Los Angeles donation service area and respondents were sent a check for $50 for their time and effort. These centers were surveyed for data from 2004 to 2008. Specifically, these trauma centers were queried for their number of trauma admissions, as well as how many of these trauma admissions were admitted to the ICU, how many had a head Abbreviated Injury Score (AIS) $\geq$ 5, how many died, and the number who became organ donors. These data were used to normalize the number of trauma organ donors per center based on patient volume and injury severity. Additionally, the trauma centers were surveyed on the presence of the 4 qualitative ACS requirements, the presence of other organ donation-related process measures (catastrophic brain injury guidelines [CBIGs; Fig. 1] and the capacity for conducting donation after circulatory determination of death [DCDD, synonymous with "donation after cardiac death" or "DCD"]), as well as the following institutional characteristics: presence of an organ donor council and if there was a trauma surgeon present on the council, the presence of a transplantation program, the presence of a surgery residency program, the level of trauma center, and whether there was an academic affiliation. In regard to CBIGs, it is important to note that they come in many forms (order sets, clinical pathways, treatment algorithms, etc) and contain recommendations for assessing and managing the physiologic derangements that accompany severe brain injuries or neurologic death. They are useful in managing patients who have been deemed to have "nonsurvivable" neurologic injuries by a neurosurgery or neurology consulting service and typically contain treatments aimed at achieving hemodynamic stability as well as standard critical care endpoints of resuscitation, but do not involve efforts to monitor or treat intracranial pressure. By so doing, they enable providers to maintain hemodynamic stability and perfusion to the entire body. This affords the opportunity to observe a patient's true clinical trajectory, allowing for clinical improvement and not eliminating any end-of-life care options at the same time. In regard to capacity for DCDD, this was defined as hospitals with the policies and procedures in place to conduct DCDD.

Survey results from each trauma center were combined with an existing database containing all referrals for donation and their outcomes in the 7-county greater Los Angeles donation service area covered by the OneLegacy OPO. Normalized donation-related outcomes (eg, the number of organ donors per 1,000 trauma admissions, donors per 1,000 ICU admissions, etc) as well as the Health Resources and Services Administration collaborative conversion rate were compared in trauma centers with and without the following characteristics: compliance with the 4 qualitative ACS requirements, presence of CBIGs, capacity for DCDD, presence of an organ donor council, presence of a trauma surgeon on the organ donor council, presence of a transplant program, presence of surgery residents, level of trauma center, and academic affiliation. According to