The Journal of Emergency Medicine, Vol. 40, No. 5, pp. 586–591, 2011

0736-4679/$–see front matter

doi:10.1016/j.jemermed.2009.08.056

Brief Reports

THE RAPID IMPACT ON MORTALITY RATES OF A DEDICATED CARE TEAM INCLUDING TRAUMA AND EMERGENCY PHYSICIANS AT AN ACADEMIC MEDICAL CENTER

Charles J. Gerardo, MD,* Seth W. Glickman, MD, MBA,† Steven N. Vaslef, MD, PHD,‡ Abhinav Chandra, MD,* Ricardo Pietrobon, MD, PHD,‡ and Charles B. Cairns, MD†

*Division of Emergency Medicine, Duke University Medical Center, Durham, North Carolina, †Department of Emergency Medicine, University of North Carolina, Chapel Hill, North Carolina, and ‡Department of Surgery, Duke University Medical Center, Durham, North Carolina

Reprint Address: Charles J. Gerardo, MD, Division of Emergency Medicine, Duke University Medical Center, Box 3096, Durham, NC 27710

□ **Abstract—Background: Trauma center designation can result in improved patient outcomes after injuries. Whereas the presence of trauma teams has been associated with improved trauma patient outcomes, the specific components, including the role of emergency medicine (EM)-trained, board-certified emergency physicians, have not been defined. Objective: To assess the outcomes of patients before and after the establishment of a dedicated trauma team that incorporated full-time EM-trained physicians with trauma specialists at a Level I trauma center at an academic institution. Methods: Secondary analysis of prospectively collected trauma registry data was performed to compare mortality rates of all treated trauma patients before and after this intervention. Results: The establishment of a dedicated specialty trauma team incorporating full-time EM presence including EM-trained, board-certified emergency physicians was associated with a reduction in overall non-DOA (dead on arrival) mortality rate from 6.0% to 4.1% from the time period preceding (1999–2000) to the time period after (2002–2003) this intervention (1.9% absolute reduction in mortality, 95% confidence interval [CI] 0.7%–3.0%). Among patients who were most severely injured (Injury Severity Score [ISS] ≥ 25), mortality rates decreased from 30.2% to 22.0% (8.3% absolute reduction in mortality, 95% CI 2.1%–14.4%). In comparison, there was minimal change in national mortality rates for patients with ISS ≥ 25 during the same time period (33% to 34%). Conclusions: The implementation of a dedicated full-time trauma team incorporating both trauma surgeons and EM-trained, board-certified or -eligible emergency physicians was associated with improved mortality rates in trauma patients treated at a Level I academic medical center, including those patients presenting with the most severe injuries. © 2011 Elsevier Inc.**

□ **Keywords: trauma; trauma team; board certification; mortality; quality improvement**

INTRODUCTION

Previous studies have demonstrated the beneficial effects of Level I trauma centers, compared with lower-level centers and non-trauma centers, on patient survival rates and functional outcomes (1–4). An important aspect of trauma care in a Level I center is the presence of a dedicated trauma team, and the use of trauma teams has been shown to improve patient outcomes (5). However, the contributions of specific elements of Level I trauma team care that lead to improved outcomes, including the integration between surgery and emergency medicine (EM) and the use of EM-trained, board-certified physicians, have not been fully evaluated.

RECEIVED: 22 December 2008; FINAL SUBMISSION RECEIVED: 21 May 2009;
ACCEPTED: 29 August 2009

Emergency physicians play an important role in the evaluation and management of patients with acute traumatic illness and injury (6). The American College of Surgeons (ACS) Committee on Trauma requires that participating trauma care team physicians be board certified "in a specialty recognized by the American Board of Medical Specialties, the Advisory Board for Osteopathic Specialties, or other appropriate foreign board" (6). However, the ACS does not specify requirements for emergency physicians, including the need for dedicated residency training in emergency medicine or certification by the American Board of Emergency Medicine (ABEM).

In 2001, our academic medical center underwent a major change in emergency physician staffing. An academic division of emergency medicine had been recently created, and an EM residency training program initiated. Existing emergency department (ED) practitioners (primarily trained in family medicine and internal medicine) were replaced almost exclusively with emergency physicians with residency training and board certification or eligibility in EM. These emergency physicians became part of the dedicated trauma team in conjunction with the surgical trauma specialists. Before this transition, the trauma surgical team (including a trauma surgery attending physician and surgical residents) was primarily responsible for the care of trauma patients, and emergency physicians were not consistently involved in trauma resuscitations. After the transition, board-certified/board-eligible (BC/BE) emergency physicians with residency training in EM led trauma resuscitations in conjunction with the trauma surgery attending physician. Using data from the Duke University Trauma Data Registry, the purpose of this study was to compare trauma patient outcomes before and after the establishment of a dedicated trauma team incorporating full-time EM-trained physicians with trauma specialists.

METHODS

This study was exempted from formal review by the Institutional Review Board of Duke University due to the exclusive use of de-identified data. The Duke University Trauma Registry Database is a clinical database of patients with acute traumatic injury treated by the trauma team at Duke University Medical Center. Duke University Medical Center is a Level I Trauma Center in Durham, NC with an annual ED census of $\sim$ 65,000 patients. Trauma patients are included in the Trauma Registry Database based on pre-established criteria determined by the North Carolina State Trauma System. These include all patients who have an International Classification of Diseases-9th Revision diagnosis of 800–959.9 and who are either admitted to the hospital for $>$ 24 h from the scene, an ED, or hospital; die in the ED or hospital; are transferred from the ED to the operating room or intensive care unit; or are transferred to another hospital. Additionally, all trauma service activations regardless of ED disposition are captured. Trauma patients who are seen and treated and released by the ED staff only are not captured in the database.

For this study, trained data collectors, blinded to the study objective, used standardized definitions to abstract the data, including demographic characteristics, Injury Severity Score (ISS), and in-hospital outcome (7). For comparison, national trauma mortality rates for patients with ISS $\geq$ 25 were obtained from the Duke Trauma Registry (these figures were previously abstracted yearly from 1999–2003 from the American College of Surgeons National Trauma Databank).

Duke University recently developed an academic division of Emergency Medicine, and a new EM residency training program was initiated. This resulted in the transition of faculty in 2001 from primarily boarded in non-EM specialties to a faculty both trained and board certified or eligible in EM. Physicians staffing the ED before the transition were not required to be present during trauma resuscitations and were not integral members of the resuscitation team. The transition to a trauma team utilizing EM-trained and boarded physicians and trauma surgery specialists was initiated in 2001 and completed by early 2002. During the pre-intervention period (1999–2000), 13% of the EM physicians were residency trained in EM and 23% were BC/BE by ABEM. During the post-intervention period (2002–2003), 90% of EM physicians were EM residency trained and 100% were BC/BE by ABEM.

Between January 1, 1999 and December 31, 2003, 7085 trauma patients were treated in the ED. Since the transition to BC/BE, EM residency-trained emergency physicians occurred during 2001, patients were divided into a pre-intervention period (1999–2000, n = 2714 patients) and a post-intervention period (2002–2003, n = 3089 patients) for the purposes of this analysis. Patients treated in 2001 (n = 1282) during the transition period were not included in the analysis.

Patients were stratified by the ISS levels of $<$ 25 and $\geq$ 25 (severely injured patients). Patients who were dead on arrival or who were transferred out of the hospital were excluded from the analysis. Mortality was defined as death from any cause during a patient's hospital course.

Baseline characteristics were compiled for patients in the pre- and post-intervention periods. The means with standard deviations and percentages are reported to describe the distribution of continuous and categorical variables, respectively. The chi-squared test was used for