Academic Time at a Level 1 Trauma Center: No Resident, No Problem?

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BACKGROUND: Globally, the compliance of resident work-hour restrictions has no impact on trauma outcome. However, the effect of protected education time (PET), during which residents are unavailable to respond to trauma patients, has not been studied. We hypothesized that PET has no impact on the outcome of trauma patients.

METHODS: We conducted a retrospective review of relevant patients at an academic level I trauma center. During PET, a trauma attending and advanced practice providers (APPs) responded to trauma activations. PGY1, 3, and 4 residents were also available at all other times. The outcome of new trauma patient activations during Thursday morning 3-hours resident PET was compared with same time period on other weekdays (non-PET) using a univariate and multivariate analysis.

RESULTS: From January 2005 to April 2010, a total of 5968 trauma patients were entered in the registry. Of these, 178 patients (2.98%) were included for study (37 PET and 141 non-PET). The mean injury severity score (ISS) was 16.2. Although no significant difference were identified in mortality, complications, or length of stay (LOS), we do see that length of emergency department stay (ED-LOS) tends to be longer during PET, although not significantly (314 vs 381 minutes, $p = 0.74$). On the multiple logistic regression model, PET was not a significant factor of complications, LOS, or ED-LOS.

CONCLUSIONS: Few trauma activations occur during PET. New trauma activations can be staffed safely by trauma activations and APPs. However, there could be some delays in transferring patients to appropriate disposition. Additional study is required to determine the effect of PET on existing trauma inpatients. (J Surg 69:138-142. © 2012 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: protected educational time, surgical residency, trauma, work-hour restriction, advanced practice providers, ACGME

COMPETENCIES: Patient Care, Practice Based Learning and Improvement, Systems Based Practice

INTRODUCTION

Since July 2003, surgical residency programs are required to implement the work-hour restriction, the so-called "80 hours rule" for the patient safety purpose by the Accreditation Council for Graduate Medical Education (ACGME).[1] To date, most of the literature has demonstrated that the limitation of work hours did not affect the outcome of patients negatively; even better outcomes were reported in a large retrospective study.[2-7] By contrast, contradictory results have been demonstrated in the literatures of surgical subspecialty, including trauma.[6-12]

To complement the workload uncovered by residents under the work-hour restriction, a large number of surgical program currently hire the advanced practice providers (APPs), physician assistant (PA) and nurse practitioner (NP).[13-16] A recent survey conducted by Pezzi et al.[14] showed that 79% of general surgery program use APPs, and significant increase of the number of APPs after implementation of work-hour restriction.[14] It is considered that 1 reason why the significant decrease of resident availability in trauma service did not have negative impact on the patient outcome is the effective use of APPs.[13]

As a part of ACGME competency requirements, each general surgery residency program have been obligated to establish educational curriculum. The implementation of a weekly structured conference program or protected block curriculum have been shown to positively affect the residents' perception of their ability in required competencies.[17,18] These protected educa-

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tional time (PET) is generally scheduled for several hours in the morning of weekdays. Of note, they are excused from all clinical duties in patient care during PET. Although this relatively short period can be covered without affecting the patient outcome, situation could be different in trauma or emergency general surgery practice. All clinical duties, including elective and emergency operation, inpatient care and new patient through emergency room need to be covered by attending surgeon and APPs. The absence of appropriate workforce might potentially result in worse outcome of patient.

The purpose of this study was to compare the outcome of trauma patients admitted to a level 1 trauma center during PET with patients admitted prior to PET. We hypothesized that PET would not have a negative impact on the outcome of the trauma patient.

PATIENTS AND METHODS

A retrospective review of the institutional trauma registry data from January 2005 to May 2010 was performed. This database is a part of the Pennsylvania Trauma Outcome Study (PTOS) maintained by the Pennsylvania Trauma System Foundation. This study was approved by the Institutional Review Board of the Milton S. Hershey Medical Center at the Pennsylvania State University. The PTOS data include all trauma patients who are admitted for longer than 48 hours, intensive care unit admission, transfer cases, and mortality cases.[11] The patients with solitary hip fracture, asphyxiation, drowning, hypothermia, or hyperthermia are excluded from PTOS data. Also burn patients were excluded from this study.

Trauma service

In an ACGME-accredited general surgery residency program at the Penn State Milton S. Hershey Medical Center, residents rotate trauma service as intern (PGY1), junior resident (PGY2 and 3) and senior resident (PGY4) for 2-3 months, respectively. Trauma service is run by 1 trauma attending surgeon of the week. During daytime of weekdays, 1 senior resident, 1 junior resident, 2-3 interns (general surgery, surgical subspecialty, emergency medicine, and anesthesia) and 1-2 APPs covers trauma inpatients, operating room cases, clinic, and new trauma patients admitted though the emergency room (ER). During this study period, all APPs in our trauma service were PAs.

Trauma activation and consultation

Level I and II trauma activation are responded and run by the trauma service. The emergency medicine attending, residents, anesthesia/operating room team, respiratory therapist, radiology resident, and X-ray technician are all to be present at the patient's arrival. Level III trauma activation is run by emergency medicine attendings and residents. Either a senior resident or trauma surgery attending also respond and participate in the initial resuscitation. A senior or junior resident usually cover trauma consultation from the ER. Each case is discussed with the trauma surgery attending.

PET

All surgical residents are required to attend a weekly structured conference, including a didactic lecture, grand round, skill training session, journal club, medical ethic conference, or in-training examination review held every Thursday at 7 AM. Until June 2008, 2 hours of sessions had been held, and this was extended to 3 hours afterward. The in-hospital pager is to be turned off during this time. The trauma surgery service pager is carried by APPs for residents. During PET, the trauma attending and APPs are in charge of all clinical duty, and the role of surgical resident in trauma resuscitation is replaced by APPs.

Statistical analysis

The patients admitted to trauma surgery service during PET (Thursday 7-9 AM from January 2005 to June 2008, 7-10 AM from July 2008 to May 2010) were included in the PET group. The patients admitted to the trauma surgery service during same time frame on Monday, Tuesday, Wednesday, and Friday were included in the non-PET group. Patient baseline characteristics and clinical outcome were collected. The in-hospital outcome was our primary outcome. We also compared the length of hospital stay (LOS), the length of ER stay, and in-hospital complication rate as secondary outcomes. In-hospital complication is defined as an unexpected event directly affecting patient care by PTOS and classified by systems. Wilcoxon tests were used for continuous variables and χ^2-tests were used for categoric variables in a univariable analysis. Multiple logistic regression models were also instituted for the multivariable analysis. Clinically significant factors were included as independent variables.

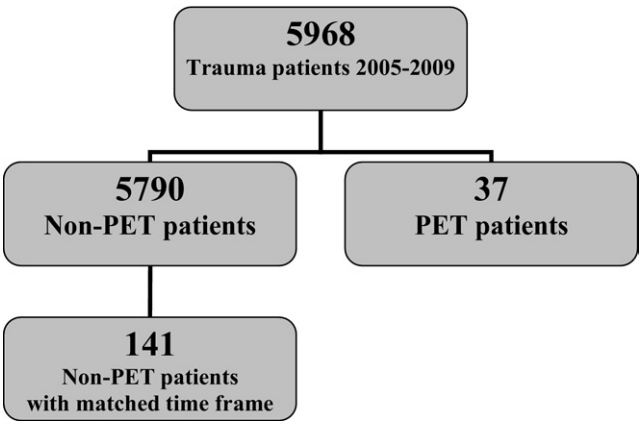

FIGURE 1. Patient selection. PET: protected educational time.