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Healthcare provider compassion is associated with lower PTSD symptoms among patients with life-threatening medical emergencies: a prospective cohort study

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Abstract

Purpose: We tested the hypothesis that, during a life-threatening medical emergency, patient perception of healthcare provider (HCP) compassion is associated with the subsequent development of post-traumatic stress disorder (PTSD) symptoms.

Methods: Prospective cohort study in the emergency department (ED) of an urban academic medical center. We included adult patients presenting with a life-threatening medical emergency, defined as respiratory or cardiovascular instability requiring a potentially life-sustaining intervention in the ED. We measured patient perception of HCP compassion in the ED using the Consultation and Relational Empathy (CARE) measure, a validated 40-point scale. Blinded to clinical outcomes (including the CARE measure), we assessed PTSD symptoms 1 month post-discharge using the PTSD Checklist for the Diagnostic and Statistical Manual of Mental Disorders-5.

Results: Of the 99/113 (88%) patients who completed follow-up, 25% (95% CI 17–35%) had PTSD symptoms at 1 month. In a multivariable model adjusting for potential confounders (e.g. severity of illness score in ED, need for intensive care unit admission, ED overcrowding, and family member emotional support in the ED), patient perception of greater HCP compassion in the ED was independently associated with lower PTSD symptoms at 1 month [odds ratio 0.93 (95% CI 0.89–0.98)]. A one-point increase in the CARE measure was associated with a 7% decrease in the odds of developing PTSD symptoms.

Conclusions: PTSD symptoms are common among ED patients with life-threatening medical emergencies. Patient perception of greater HCP compassion during the emergency is independently associated with lower risk of developing PTSD symptoms.

Keywords: Post-traumatic stress disorder, PTSD, Compassion, Empathy

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Introduction

Post-traumatic stress disorder (PTSD) is a common psychological disorder characterized by re-experiencing distressing symptoms, effortful avoidance of trauma reminders, and physiological hyperarousal in individuals who have been exposed to a traumatic event [1]. Critical illness is by definition a life-threatening experience, which predisposes many patients to these chronic neuropsychological symptoms, and it is estimated that 25% of intensive care unit (ICU) survivors suffer from PTSD symptoms [2]. Not only are PTSD symptoms psychologically distressing, but they are associated with (1) poor physical health-related quality of life [3], (2) inability to return to work 12 months after hospital discharge [4], and (3) increased healthcare costs [5]. In addition, the presence of PTSD symptoms 1 month after a traumatic event in the hospital is associated with subsequent major adverse cardiac events (MACE) and all-cause mortality [6, 7].

Compassionate care is considered a vital aspect of high-quality healthcare by patients, families, and clinicians [8]. Not only is compassionate care desired by patients, but in the setting of neuropsychological disease states, compassionate care is associated with (1) reduced stress-mediated disease pathophysiology, (2) increased stress buffering, (3) antidepressant effects, and (4) attenuation of somatic disease effects on psychological and emotional well-being [9]. Thus, increasing compassionate care in the ED may be a potential simple intervention that can help prevent the development of PTSD symptoms among critically ill patients.

The objectives of this prospective cohort study were to (1) determine the rate of PTSD symptoms 1 month after discharge among patients presenting to the ED with a life-threatening medical emergency (i.e. respiratory or cardiovascular instability requiring a potentially life-sustaining intervention) and (2) test the association between patient perception of compassion from ED healthcare providers and PTSD symptoms 1 month after discharge. We hypothesized that increased patient perception of compassion in the ED is associated with a decreased risk of PTSD symptoms 1 month after discharge.

Take-home message

Post-traumatic stress disorder (PTSD) symptoms are common among emergency department patients with life-threatening medical emergencies. Patient perception of greater healthcare provider compassion during the emergency is independently associated with a lower rate of PTSD symptoms.

Methods

Setting

We performed a prospective cohort study at an urban academic hospital in the USA. The institutional review board at our institution approved this study, and all subjects provided written informed consent to participate in the study. This study is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (Supplemental Material) [10].

Participants

We included adult patients presenting to the ED with a life-threatening medical emergency (i.e. respiratory or cardiovascular instability) requiring an acute, potentially life-sustaining intervention in the ED between January and December 2018. Inclusion criteria were as follows: (1) age $\geq$ 18 years, and (2) clinician decision to initiate one of the following potentially life-sustaining interventions in response to respiratory or cardiovascular instability in the ED: noninvasive positive pressure ventilation (NPPV), continuous administration of inhaled beta-agonist, placement of an invasive airway (e.g. laryngeal mask airway, endotracheal intubation, cricothyrotomy), placement of a thoracostomy tube for non-traumatic pathology, continuous infusion of vasoactive agents (e.g. norepinephrine or nicardipine infusion), or placement of a central venous catheter for volume resuscitation. Exclusion criteria included the following: (1) not able to follow commands on arrival to ED (i.e. Glasgow coma motor scale < 6), (2) traumatic etiology of ED presentation, (3) previous diagnosis of PTSD, (4) previous diagnosis of other mental health disorder (i.e. bipolar disorder, schizophrenia, schizoaffective disorder), (5) previous diagnosis of dementia, (6) unable or declined to give informed consent, (7) non-English speaking, (8) pregnancy, or (9) prisoner. Potential subjects were asked about their past medical history, and electronic medical records were reviewed to identify potential exclusion criteria.

Data collection

At the time of leaving the ED (i.e. either time of hospital admission or discharge home from the ED for patients not admitted to the hospital) we assessed patient perception of healthcare provider compassion in the ED using the Consultation And Relational Empathy (CARE) measure. The CARE measure is a previously validated patient-assessed measure of perceived compassion during patient care (Supplemental Methods) [11–14]. The individual item scores on the CARE measure were summed to obtain the total CARE measure score with higher scores indicating greater perceived compassion (score range 10–50). We also assessed patient perception

of family and/or friend negative emotional support (i.e. presence of support person increased patient anxiety) in the ED using a set of two questions each asked on a five-point Likert scale ranging from 1 (none of the time) to 5 (all of the time) (Supplemental Methods) [15]. The responses of the two questions were summed together to achieve the negative emotional support score as previously described [15]. We collected data on ED length of stay, as well as ED crowding at the time of patient arrival using the National Emergency Department Over Crowding Study (NEDOCS) tool [16]. We abstracted demographics, comorbid conditions (i.e. Charlson comorbidity index) [17], vital signs on ED arrival, severity of illness in the ED [i.e. Acute Physiologic Assessment and Chronic Health Evaluation (APACHE) II score] [18], and therapeutic interventions performed in the ED from the medical record.

Outcome measure

The primary outcome measure was the presence of PTSD symptoms at 1 month after discharge. We selected 1 month as the follow-up time period for assessment of PTSD symptoms because a 1 month period post-event is a criterion for PTSD diagnosis [1]. PTSD symptoms at 1 month are also clinically significant as they are associated with increased risk for subsequent MACE and all-cause mortality [6, 7, 19]. We evaluated subjects for PTSD symptoms 1 month after hospital discharge using the post-traumatic stress disorder checklist for the Diagnostic and Statistical Manual of Mental Disorders (DSM)-5 (PCL-5). The PCL-5 is a reliable and well-validated (e.g. against the clinician-administered PTSD Scale for DSM-5, the gold-standard structured PTSD diagnostic interview) 20-item (each scored on a 0–4 Likert scale) self-reported measure that assesses the 20 DSM-5 symptoms of PTSD (Supplemental Methods) [20, 21], which has been used in previous studies to assess ICU-related PTSD symptoms [22]. We contacted subjects via phone for administration of the measure, and all subjects were asked to answer the questions in relation to their previous ED visit. A clinical psychologist who was blinded to all data pertaining to the initial ED visit, specifically the CARE measure scores, oversaw all PTSD assessments. We considered patients to have PTSD symptoms if they scored 2 or more on at least one B item (questions 1–5), one C item (questions 6–7), two D items (questions 8-14), and two E items (questions 15-20), or a total score of 33 points or more [20, 23]. We entered all data into Research Electronic Data Capture (REDCap), a secure web-based application designed to support data capture for research studies [24], and exported into Stata/SE 15.1 for Mac (StataCorp LP, College Station, TX, USA) for analysis.

Data analysis

We began the analysis with descriptive statistics. We used the *t* test or Wilcoxon rank-sum test to compare continuous variables, based on the distribution of the data, and chi-squared or Fisher's exact test to compare categorical variables between patients who had PTSD symptoms and those who did not. We also used similar methodology to compare characteristics between those included in the primary analysis and those lost to follow-up. We calculated the rate of PTSD symptoms at 1 month with 95% confidence intervals (CI) for the entire cohort, as well as among subjects who were admitted to the ICU and those discharged or admitted to a non-critical-care setting. We tested the internal reliability for the CARE measure using Cronbach's alpha. We also used Cronbach's alpha to test the internal reliability of the PCL-5.

For the primary outcome, we calculated odds ratios (OR) using multivariable logistic regression analysis to test whether patient perception of healthcare provider compassion in the ED (i.e. CARE measure scores) is a predictor of PTSD symptoms at 1 month. We selected the following co-variables for inclusion in the regression model a priori [25], on the grounds that they were previously demonstrated to predict PTSD symptoms after hospitalization: (1) negative emotional support score [15], (2) ED overcrowding (defined by NEDOCS > 100) [16, 26], (3) severity of illness in the ED (APACHE II score), and (4) admission to the ICU (versus discharge home or admission to a non-critical-care setting) [27]. Goodness of fit of the model was evaluated with the Hosmer–Lemeshow test. To test whether our model was correctly specified, we used the linktest command in Stata.

We performed several additional pre-planned sensitivity analyses for the primary outcome. First, our primary analysis was repeated with missing data imputed using multiple imputation by chained equations. Second, given the possibility of other measured confounders beyond those pre-specified, we entered additional covariables, which were found to be associated with PTSD symptoms at 1 month on univariate analysis with criteria for inclusion of $p < 0.1$, into a multivariable logistic regression model. Third, we used multivariable linear regression to test the association between PCL-5 score at 1 month entered as a continuous variable and patient perception of healthcare provider compassion in the ED, adjusting for co-variables entered in our initial model. For all models, conservative robust standard errors were used to reduce the risk of type I error.

Results

A total of 113 subjects were enrolled, and 99 were included in the primary analysis (Fig. 1). Compared to

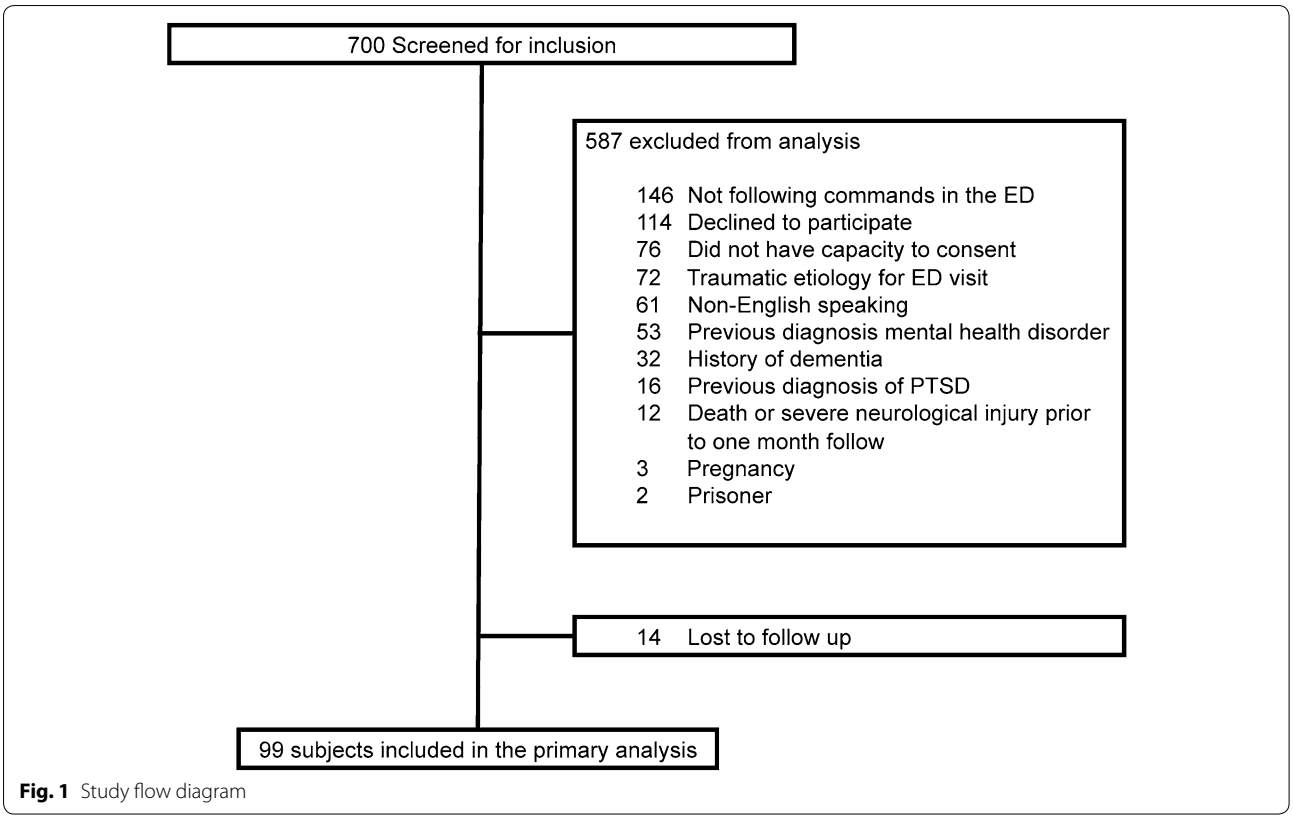

Fig. 1 Study flow diagram

those included in the primary analysis, those lost to follow-up had similar characteristics; however, those lost to follow-up were more likely to have received continuous beta-agonist administration and a greater proportion were Black/African American individuals (although not statistically significant) (Supplemental Table 1). The median [interquartile range (IQR)] CARE measure score was 42 (37–49) among the entire cohort, and 38 (31–46) versus 44 (39–50) among those with and without PTSD symptoms ($p=0.029$). We found the median (IQR) CARE measure scores to be similar among those who were admitted to the ICU and those discharged or admitted to a non-critical-care setting, 41 (35–48) versus 43 (37–50), respectively ($p=0.629$). The distribution of the CARE measure scores is displayed in Supplement Fig. 1. Six patients were missing a response to a CARE measure question. The CARE measure had excellent internal reliability among the included cohort (Cronbach's alpha = 0.96).

Table 1 displays baseline data at the time of presentation to the ED for all subjects in the cohort. The majority of subjects were white/Caucasian (59%) and presented during a time of ED overcrowding (57%). Patient characteristics were similar between those with and without PTSD symptoms. Table 2 displays ED and hospital characteristic for all subjects. We found no difference in severity of illness, length of ED or hospital stay, or disposition from the ED between those with and without PTSD symptoms.

The PCL-5 had excellent internal reliability among the included cohort (Cronbach's alpha = 0.94). The median (interquartile range) for the PCL-5 was 7 (0–30). The rate of PTSD symptoms at 1 month for the entire cohort was 25% (95% CI 17–35%). Assuming all 14 patients lost to follow-up did not have PTSD symptoms at one month the rate was 22% (95% CI 15–31%). Rates were not significantly dissimilar between those who were admitted to the ICU and those discharged or admitted to a non-critical-care setting, 23% (95% CI 11–38%) vs. 27% (95% CI 16–40%), respectively.

In our multivariable logistic regression model we found only patient perception of healthcare provider compassion in the ED to be associated with PTSD symptoms at 1 month, odds ratio 0.93 (95% CI 0.88–0.98) (Supplemental Table 2). A one-point increase in the CARE measure is associated with a 7% decrease in the odds of PTSD symptoms at 1 month. Our results remained consistent when missing data were imputed using multiple imputation, odds ratio 0.94 (95% CI 0.90–0.98) (Supplemental Table 3). Several variables were statistically different at $p<0.10$ when comparing patients with and without PTSD symptoms: Black/African American (56% vs. 34%),

Table 1 Baseline data for all subjects at time of presentation to the emergency department (ED)

Variables	All subjects *n* = 99	No PTSD *n* = 74	PTSD[a] *n* = 25	*p* value*
Age [years (SD)]	59 (13)	59 (13)	57 (10)	0.422
Female [*n* (%)]	39 (39)	27 (36)	12 (48)	0.308
Race [*n* (%)]				
White/Caucasian	58 (59)	48 (65)	10 (40)	0.029
Black/African American	39 (39)	25 (34)	14 (56)	0.049
Other	2 (2)	1 (1)	1 (4)	0.443
Hispanic ethnicity [*n* (%)]	14 (14)	11 (15)	3 (12)	1
Pre-existing comorbidities [*n* (%)]				
Diabetes	38 (38)	28 (38)	10 (40)	0.848
Known coronary artery disease	27 (27)	22 (30)	5 (20)	0.441
Hypertension	76 (77)	55 (74)	21 (84)	0.417
Malignancy	14 (14)	13 (18)	1 (4)	0.110
Renal insufficiency	20 (20)	14 (19)	6 (24)	0.584
Pulmonary disease	41 (41)	25 (34)	16 (64)	0.008
Cerebral vascular disease	9 (9)	8 (11)	1 (4)	0.442
Congestive heart failure	32 (32)	23 (31)	9 (36)	0.649
Charlson comorbidity score [17]	2 (1–4)	2 (1–3)	2 (1–4)	0.762
Presenting ED vital signs				
Heart rate (beats/min)	108 (90–125)	112 (96–127)	92 (70–118)	0.024
Mean arterial blood pressure (mmHg)	111 (77–125)	112 (79–127)	111 (73–120)	0.481
Respiratory rate (breaths/min)	26 (22–31)	26 (22–31)	25 (20–30)	0.614
NEDOCS at time of arrival	104 (76–140)	105 (78–140)	103 (69–128)	0.669
ED overcrowding at time of arrival [*n* (%)][b]	56 (57)	42 (57)	14 (56)	0.947

Median and interquartile range displayed unless otherwise noted

SD standard deviation

[a] Post-traumatic stress disorder (PTSD) symptoms, defined as a score of 2 or more on at least one B item (questions 1–5), one C item (questions 6–7), two D items (questions 8–14), and two E items (questions 15–20), or a total score of 33 points or more on the post-traumatic stress disorder checklist for the Diagnostic and Statistical Manual of Mental Disorders-5 at 1 month

[b] National Emergency Department Over Crowding Study (NEDOCS) tool score > 100

**p* values compare patients with and without PTSD symptoms

history of chronic pulmonary disease (64% vs. 34%), presenting heart rate in the ED (92 vs. 112 beats/min), and respiratory intervention (72% vs. 54%), specifically NPPV (64% vs. 39%). Patient perception of healthcare provider compassion in the ED remained an independent predictor of PTSD symptoms at one month after adjusting for these additional covariables (Supplemental Table 4).

In our linear regression model we found patient perception of healthcare provider compassion in the ED to be an independent predictor of the PCL-5 score (entered as a continuous variable), $\beta = -0.78$ (95% CI −1.24 to −0.32) (Supplemental Table 5). Figure 2 displays the predicted probability for the PCL-5 by CARE measure score.

Discussion

In this prospective cohort study, we tested the association between patient perception of healthcare provider compassion in the ED and PTSD symptoms 1 month after discharge among patients presenting to the ED with a life-threatening medical emergency. We found that approximately one in four patients presenting to the ED with a life-threatening medical emergency had PTSD symptoms at 1 month. These results are similar to previous studies evaluating PTSD symptoms among ICU survivors [2, 27]. In our cohort, the rate of PTSD symptoms at 1 month was similar regardless if patients were admitted to the ICU or not, suggesting that a life-threatening event in the ED itself puts patients at risk for the development of PTSD symptoms. We also found that patient perception of compassion in the ED was an independent predictor of PTSD symptoms at 1 month. These results remained consistent on multiple sensitivity analyses.

There is biological plausibility by which compassionate care could reduce the risk for the development of PTSD symptoms. The development of PTSD symptoms in survivors of critical illness has been linked to

Table 2 Emergency department (ED) and hospital characteristics for all subjects

Variables	All subjects *n* = 99	No PTSD[a] *n* = 74	PTSD *n* = 25	*p* value*
Medical emergency [*n* (%)]				
Respiratory	58 (59)	40 (54)	18 (72)	0.115
NPPV	45 (45)	29 (39)	16 (64)	0.031
Continuous beta-agonist	12 (12)	8 (11)	4 (16)	0.492
Invasive airway	9 (9)	8 (11)	1 (4)	0.442
Tube thoracostomy	4 (4)	4 (5)	0	0.569
Cardiovascular	45 (45)	38 (51)	7 (28)	0.043
APACHE II score in the ED	12 (9–15)	12 (9–15)	13 (10–15)	0.531
Negative family and/or friend emotional support	3 (2–5)	3 (2–5)	3 (2–5)	0.925
ED length of stay (hours)	11 (7–17)	10 (7–16)	13 (6–26)	0.396
Disposition from the ED [*n* (%)]				
Discharge home	1 (1)	1 (1)	0	1
Medical floor/telemetry	54 (55)	38 (51)	16 (64)	0.272
Catheterization laboratory	4 (4)	4 (5)	0	0.569
Intensive care unit	40 (40)	31 (42)	9 (36)	0.604
Hospital length of stay (days)	5 (2–7)	5 (2–7)	5 (3–8)	0.299

Median and interquartile range displayed unless otherwise noted

APACHE Acute Physiologic Assessment and Chronic Health Evaluation, *NPPV* noninvasive positive pressure ventilation

[a] Post-traumatic stress disorder (PTSD) symptoms, defined as a score of 2 or more on at least one B item (questions 1–5), one C item (questions 6–7), two D items (questions 8–14), and two E items (questions 15–20), or a total score of 33 points or more on the post-traumatic stress disorder checklist for Diagnostic and Statistical Manual of Mental Disorders-5 at 1 month

*p values compare patients with and without PTSD symptoms

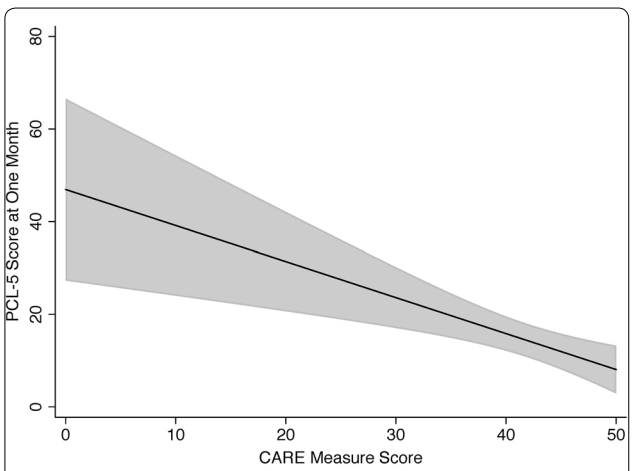

Fig. 2 Linear regression line* for association between the post-traumatic stress disorder checklist for the Diagnostic and Statistical Manual of Mental Disorders-5 (PCL-5) score at 1 month and the Consultation and Relational Empathy (CARE) measure score in the emergency department (ED). Shaded area, 95% confidence intervals. *Adjusted for negative family and/or friend emotional support in the ED, ED overcrowding, severity of illness in the ED, and admission to the ICU vs. discharge/admission to a non-critical-care setting

perceived threat and acute psychological stress during resuscitation care [28, 29]. A central mechanism contributing to the development of PTSD symptoms is the process by which traumatic memories are formed [30]. Specifically, perceived threat can result in peri-traumatic dissociation, defined as an alteration in time or place with reported feelings of depersonalization, altered perceptions of pain, feeling disconnected, or tunnel vision [31]. Peri-traumatic dissociation consequently leads to traumatic information being encoded in somatosensory, affective, nonlinguistic, and relatively uncontrolled fragmented memories [32], thus increasing the risk for developing PTSD symptoms [31].

Unique to the emergency care phase of therapy in the ED, as opposed to military or civilian trauma in the field, there is a time frame in which healthcare providers are interacting with patients during, as opposed to after, a potentially psychologically traumatic event. We hypothesize that increased compassion during such events may decrease the degree of perceived threat and thus attenuate the development of PTSD severity in survivors of critical illness. However, future trials are required to determine whether increasing compassionate care in the ED reduces perceived threat and PTSD severity.

This study provides evidence that critically ill patients undergoing acute resuscitation in the ED are at risk for developing PTSD symptoms at rates similar to patients admitted to the ICU for over 48 h [2, 27]. Further research is required to determine the individual effects of ED versus ICU experiences on PTSD symptom development. Rates of PTSD symptoms in our cohort were also similar to survivors of stroke and transient ischemic attack [33], and higher than survivors of acute coronary syndromes [6]. In addition, this study provides scientific rationale for the development and testing of interventions aimed at increasing compassionate care in the ED. It may seem intuitive that compassion is a crucial aspect of patient care and healthcare providers instinctively provide compassion in the ED. However, although CARE measure scores tended to be high, in this study only 22% of patients gave their providers a perfect score on the CARE measure. These results are consistent with recent evidence that there is currently a lack of (or inconsistency in) compassionate care across healthcare systems globally [9], with physicians frequently overlooking opportunities to be compassionate, instead taking a narrow biomedical focus [34]. Thus, there is an opportunity to intervene and improve compassionate care in the ED.

We acknowledge that this study has important limitations to consider. First, this was an observational study, and thus we can only report association rather than infer causation. Second, measurement of patient perception of compassion may be subjective and patient dependent. However, the presumed mechanisms by which patients do or do not develop PTSD symptoms are dependent on patient perception of events. Thus, a patient assessment of compassion, as opposed to a third-party observer or self-assessment by healthcare providers, is most appropriate. In addition, we used a previously validated measurement tool, which has been demonstrated to measure a construct (i.e. compassion), which is unique and distinct from patient satisfaction [12, 14]. Thus, the CARE measure is not just another patient satisfaction measure. Also, to reduce the risk of recall bias, we prospectively measured patient perception of compassion in the ED while patients were still in the hospital, as opposed to at the time of PTSD assessment. Third, we acknowledge that the PCL-5 is a screening tool and not diagnostic for PTSD. However, the PCL-5 is a well-validated measurement tool and is commonly used in research studies to quantify PTSD symptoms [20–22]. Additional research is needed to test whether increasing compassion in the ED reduces other outcomes shown to be associated with hospital-related PTSD symptoms (e.g. inability to return to work, MACE). Fourth, 12% of subjects were lost to follow-up. However, even assuming that none of the patients lost to follow-up developed PTSD symptoms, the rate of PTSD symptoms at one-month remains substantial.

In summary, the presence of PTSD symptoms 1 month after discharge is common among patients presenting to the ED with a life-threatening medical emergency, independent of ICU admission, and is associated with patient perception of healthcare provider compassion in the ED. Future research is warranted to test interventions aimed at increasing compassionate care in the ED, and the impact of these interventions on the development of PTSD symptoms.

Electronic supplementary material
The online version of this article (https://doi.org/10.1007/s00134-019-05601-5) contains supplementary material, which is available to authorized users.

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Compliance with ethical standards

Conflicts of interest
Dr. Trzeciak is an author on a soon to be released book about compassion science, entitled, "Compassionomics". None of the other authors have potential conflicts of interest to disclose.

Ethical statement
The institutional review board at our institution approved this study, and all subjects provided written informed consent to participate in the study.

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