

Predictors of posttraumatic stress disorder and return to usual major activity in traumatically injured intensive care unit survivors[☆]

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Abstract

Objective: To assess intensive care unit (ICU)/acute care service-delivery characteristics and pre-ICU factors as predictors of posttraumatic stress disorder (PTSD) and return to usual major activity after ICU admission for trauma.

Method: Data from the National Study on the Costs and Outcomes of Trauma were used to evaluate a prospective cohort of 1906 ICU survivors. We assessed PTSD with the PTSD Checklist. Regression analyses ascertained associations between ICU/acute care service-delivery characteristics, pre-ICU factors, early post-ICU distress and 12-month PTSD and return to usual activity, while controlling for clinical and demographic characteristics.

Results: Approximately 25% of ICU survivors had symptoms suggestive of PTSD. Increased early post-ICU distress predicted both PTSD and diminished usual major activity. Pulmonary artery catheter insertion [risk ratio (RR) 1.28, 95% confidence interval (95% CI) 1.05–1.57, $P=.01$] and pre-ICU depression (RR 1.23, 95% CI 1.02–1.49, $P=.03$) were associated with PTSD. Longer ICU lengths of stay (RR 1.21, 95% CI 1.03–1.44, $P=.02$) and tracheostomy (RR 1.29, 95% CI 1.05–1.59, $P=.01$) were associated with diminished usual activity. Greater preexisting medical comorbidities were associated with PTSD and limited return to usual activity.

Conclusions: Easily identifiable risk factors including ICU/acute care service-delivery characteristics and early post-ICU distress were associated with increased risk of PTSD and limitations in return to usual major activity. Future investigations could develop early screening interventions in acute care settings targeting these risk factors, facilitating appropriate treatments.

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Keywords: Stress disorder, Posttraumatic; Critical care; Intensive care unit; Risk factors; Outcome assessment (health care)

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1. Introduction

Every year, over half a million Americans are injured so severely that they require intensive care unit (ICU) hospitalization [1]. Patients who survive traumatic injuries have impairments in health-related quality of life (HRQOL) [2,3] and are at risk for developing posttraumatic stress disorder (PTSD) [4,5]. In addition, a recent systematic review suggests that survivors of general ICU hospitalization have a substantial prevalence of clinically significant PTSD symptoms [6].

However, previous studies of post-ICU PTSD have several limitations. Most had sample sizes less than 100 patients and were completed at one site; the largest published study of post-ICU PTSD was done in five sites and enrolled 304 patients [7]. Also, prior studies have yielded inconsistent results regarding whether ICU service-delivery characteristics, such as ICU length of stay (LOS), endotracheal intubation and mechanical ventilation, were associated with post-ICU PTSD [6,8]. These investigations have not examined either potential associations between many other ICU illness and service-delivery characteristics and long-term outcomes. Importantly, prior studies have rarely addressed the role that pre-ICU depression may have in the development of post-ICU PTSD [6,8]. In addition, prior investigations have not explored associations between pre-ICU factors, ICU and acute care illness and service-delivery characteristics with the ability to return to usual work or school activities.

The National Study on the Costs and Outcomes of Trauma (NSCOT) is the largest, multicenter investigation in the US to date that has followed PTSD symptoms after acute care treatment for physical injuries. The investigation enrolled patients from 69 hospitals [9]; in addition, it encompasses the largest cohort of trauma patients to survive ICU stays and to have follow-up of subsequent psychopathology and return to usual major activity. A previous report from this study ascertained that admission to an ICU following physical injury was independently associated with the development of symptoms suggestive of a diagnosis of PTSD 12 months post-injury [10].

The aim of the current investigation was to utilize the NSCOT study to extend beyond prior investigations by exploring the roles that ICU and acute care illness and service-delivery characteristics, as well as pre-ICU depression, medical comorbidities and early post-ICU distress, have in the development of PTSD symptoms and return to usual major activity 1 year after ICU stays. We hypothesized that ICU and acute care illness and service-delivery characteristics would be independently associated with elevations in post-ICU PTSD symptoms and limitations in post-ICU return to usual major activity, even when accounting for pre-ICU factors and early psychological distress.

2. Methods

2.1. Setting

The NSCOT was a multisite prospective cohort study designed to compare the long-term outcomes of care at trauma centers to care provided at nontrauma center acute care hospitals [9]. All Level I trauma centers and large nontrauma center hospitals within US Metropolitan Statistical Areas were identified. Patients were enrolled from 69 hospitals. Eighteen (66.7%) of 27 Level I trauma centers and 51 (40.8%) of 124 nontrauma center hospitals agreed to participate. Participating hospitals were located in California, Florida, Illinois, Indiana, Maryland, Massachusetts, Michigan, New Jersey, New York, North Carolina, Pennsylvania and Washington. The study was approved by the institutional review boards of each participating hospital. Informed consent was obtained from all subjects prior to conducting NSCOT patient assessments.

2.2. Patient population

Patients were recruited between July 2001 and November 2002. English- and Spanish-speaking patients between the ages of 18 and 84 years were eligible if they arrived alive at participating hospitals and required treatment for moderate to severe injuries, as defined by at least one injury with an Abbreviated Injury Scale (AIS) score ≥ 3 (an injury severity level of serious or greater). Patients who were both intentionally injured (e.g., injured by physical assault) or unintentionally injured (e.g., motor vehicle accidents, on the job injuries) were eligible. The current investigation focused exclusively on the subsample of patients who survived ICU hospitalization for their trauma and were assessed for PTSD symptoms 12 months after injury. The NSCOT used a quota sampling strategy to ensure adequate representation of injuries and age strata across centers; therefore, not all eligible subjects were enrolled. Subjects were ineligible if they were 65 years of age or older and had a primary diagnosis of hip fracture, had a major burn, had treatment delays greater than 24 h or were incarcerated at the time of injury.

2.3. Measures

Data regarding acute care hospitalization were obtained via medical record review by trained nurse abstractors. Information on ICU and acute care illness and service-delivery characteristics, including endotracheal intubation, mechanical ventilation, ICU LOS, duration of mechanical ventilation, reintubation, blood product transfusion within the first 24 h of hospitalization, tracheostomy, thoracotomy, receipt of paralytic agents at any point during hospitalization, pulmonary artery catheter (PAC) insertion, sepsis, acute respiratory distress syndrome (ARDS), cardiac arrest and multiple organ failure, was abstracted, as were data regarding preinjury medical comorbidity and medication use. Severity of injury by body region was coded using the AIS, and the

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