

ORIGINAL ARTICLE

Hospital Delirium and Psychological Distress at 1 Year and Health-Related Quality of Life After Moderate-to-Severe Traumatic Injury Without Intracranial Hemorrhage



Christine M. Abraham, MA,^a William T. Obremskey, MD, MPH,^a Yanna Song, MS,^b James C. Jackson, PsyD,^c E. Wesley Ely, MD, MPH,^{c,d} Kristin R. Archer, PhD, DPT^a

From the Departments of ^aOrthopaedic Surgery and Rehabilitation, and ^bBiostatistics, Vanderbilt University, School of Medicine, Nashville, TN; ^cDivision of Allergy/Pulmonary/Critical Care Medicine, Center for Health Services Research, Vanderbilt University, School of Medicine, Nashville, TN; and ^dGeriatric Research Education and Clinical Center for the Tennessee Valley Veteran's Affairs Healthcare System, Nashville, TN.

Abstract

Objectives: To determine whether delirium during the hospital stay predicted health-related quality of life (HRQOL) at 1 year after injury in trauma intensive care unit (ICU) survivors without intracranial hemorrhage, and to examine the association between depressive and posttraumatic stress disorder (PTSD) symptoms and each of the HRQOL domains at 1-year follow-up.

Design: Prognostic cohort with a 1-year follow-up.

Setting: Level 1 trauma ICU.

Participants: Adult patients without intracranial hemorrhage (N=173) admitted to a level 1 trauma ICU.

Interventions: Not applicable.

Main Outcome Measures: HRQOL was measured with the Medical Outcomes Study 36-Item Short-Form Health Survey at 1 year after traumatic injury.

Results: Average delirium duration \pm SD was $.51 \pm 1.1$ days. Hierarchical multivariable linear regression analyses did not find a statistical relationship between delirium and HRQOL at 1-year follow-up. However, increased levels of depressive symptoms at 1 year were statistically associated with poorer functioning in all physical and mental health HRQOL domains, whereas PTSD at 1 year was statistically associated with all HRQOL domains except role-physical ($P < .05$).

Conclusions: There was no statistical association between delirium during the hospital stay and HRQOL at 1 year, which may be due to the short time spent in delirium by our study population. Depressive symptoms demonstrated a stronger relationship with mental and physical HRQOL domains at 1 year than PTSD, indicating their own unique pathway after trauma. Findings lend support for the separate assessment and management of depression and PTSD. Additional research on the duration and subtypes of delirium is needed within the trauma ICU population, as the effects are not widely known.

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In the United States, approximately 2.5 million people per year sustain physical trauma, with direct and indirect costs estimated at \$146 billion over a lifetime.^{1,2} Although trauma care continues to improve, physical and psychological outcomes remain poor.³ Studies^{3,4} have found that only 50% to 60% of trauma survivors return to work, and even those who return to work have limitations performing their jobs. Furthermore, trauma survivors consistently

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report lower health-related quality of life (HRQOL) than population norms.³⁻⁶

To understand the determinants of poor HRQOL in trauma survivors, studies have investigated various demographic, clinical, and psychological variables. Age and sex have been shown to be predictors, with older adults and women reporting poorer long-term HRQOL.^{4,5} Clinical aspects that account for poor HRQOL are the presence of comorbidities,⁷ lower extremity fractures,⁵ and a longer stay in the intensive care unit (ICU).⁸ Higher Injury Severity Scores (ISSs), although not as consistent, have demonstrated a relationship to poor HRQOL.^{5,6,9,10}

Trauma outcomes are not predicated on physical injury alone, but are dependent on the psychological responses that contribute to overall disability.¹¹⁻¹³ Depressive and posttraumatic stress disorder (PTSD) symptoms are prevalent in the trauma population, with 30% to 40% of survivors having depressive symptoms and 20% to 30% having PTSD within the first year of recovery.¹¹⁻¹⁷ High levels of depressive and PTSD symptoms, in particular, have independently predicted lower long-term HRQOL.^{6,7,11,18}

Those admitted to the ICU are at greater risk for long-term disability not only because of the severity of injury, but also because of the potential lasting effects of ICU delirium (ie, mental disorder characterized by fluctuating levels of consciousness).^{5,6,9,10,19,20} Studies²⁰⁻²² indicate that those experiencing delirium have lasting cognitive impairment and poorer HRQOL. Van Rompaey et al²¹ demonstrated that patients admitted to the medical/surgical ICU who experienced delirium had lower HRQOL than patients without delirium at 3- and 6-month follow-up, with only the nondelirium group reaching population norms at 6 months after hospital discharge. More recently, van den Boogaard et al²² found an association between delirium and lower HRQOL and decreased cognitive functioning at 18-month follow-up in a general ICU population. However, when adjusted for covariates, only delirium and cognitive impairment remained statistically significant. To our knowledge, no study has examined the long-term effects of delirium specific to a trauma ICU population.

This study aimed to determine whether delirium during the hospital stay predicted HRQOL at 1 year after injury in trauma ICU survivors without intracranial hemorrhage. We hypothesized that increased delirium duration would independently predict poorer HRQOL, as our work and that of others have supported a relationship in medical/surgical ICU populations.^{20,21} We also examined the cross-sectional relationship between depressive and PTSD symptoms and separate physical and mental HRQOL domains at 1-year follow-up. While robust evidence supports the association between psychological distress and HRQOL in trauma survivors,¹¹⁻¹⁸ limited research has examined the independent contribution of depressive and PTSD symptoms to specific

domains of HRQOL in a broad trauma population without brain injury (ie, no intracranial hemorrhage).⁸

Methods

Participants

Consecutive adult patients without brain injury admitted to a Level 1 trauma ICU for extremity, head/neck, abdomen/pelvis, and thorax injuries were considered for inclusion. The criteria for study inclusion were as follows: (1) age ≥ 18 years; (2) having a head computed tomography scan showing no intracranial hemorrhage (ie, without brain injury); (3) English speaking; and (4) having an ISS >15 . Patients who had a traumatic brain injury, spinal cord deficit, schizophrenia or other psychotic disorder, as documented in the medical record, were excluded from the study because patients with these conditions have a different recovery trajectory than that of the general trauma population, and follow-up for these patients is poor. Approval for the study was obtained from the medical center's institutional review board.

Procedures

Patients in the trauma ICU were approached for participation. Surrogate consent was sought for patients receiving mechanical ventilation; patient consent was obtained before hospital discharge.

Participants were monitored twice daily for delirium. Patients were also interviewed to determine their highest level of schooling, income level, smoking status, preinjury employment, and alcohol dependence. Patient characteristics were abstracted from the medical record and included age, sex, race, ISS, admission Glasgow Coma Scale score, comorbidities, mechanism of injury, presence of concussion, days receiving mechanical ventilation, and length of hospital and ICU stay. One year after hospital discharge, study patients completed a follow-up assessment in person, by mail, or by telephone. This assessment evaluated HRQOL and depressive and PTSD symptoms using validated self-report instruments.

Measures

Delirium

Delirium was assessed twice daily using the Confusion Assessment Method for the ICU (CAM-ICU).^{19,23} If either CAM-ICU assessment during a day was positive, then the patient was considered delirious on that day. The CAM-ICU is a valid and reliable bedside diagnostic instrument designed for those who are nonverbal or receiving mechanical ventilation, or both. The CAM-ICU has proven reliable and valid in hospital and ICU settings.^{19,20,24}

Alcohol dependence

The CAGE (Cut down, Annoyed, Guilty, Eye-opener) is a 4-item yes/no questionnaire, with 2 affirmative answers indicating alcohol dependence.²⁵ It has demonstrated high test-retest reliability (intraclass correlation coefficient $>.80$) and moderate correlations ($r >.50$) with other alcohol screening instruments.²⁶

Health-Related Quality of Life

The Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) is a generic measure of quality of life based on the following 8 domains: vitality, physical functioning, bodily pain,

List of abbreviations:

BDI-II	Beck Depression Inventory-II
CAM-ICU	Confusion Assessment Method for the ICU
DSM-IV	<i>Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition</i>
DTS	Davidson Trauma Scale
HLR	hierarchical linear regression
HRQOL	health-related quality of life
ICU	intensive care unit
ISS	Injury Severity Score
PTSD	posttraumatic stress disorder
SF-36	Medical Outcomes Study 36-Item Short-Form Health Survey

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