Published in final edited form as:

Crit Care Med. 2020 November ; 48(11): 1694–1696. doi:10.1097/CCM.0000000000004629.

Early forecasting of PTSD symptoms after critical illness: Partly cloudy but clearing

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Keywords

critical illness; post-intensive care syndrome; long-term impairments; screening; prediction; mental health; rehabilitation

Among the millions of critical illness survivors each year, many experience new or worsening mental, cognitive, and physical health problems, collectively known as post-intensive care unit syndrome (PICS).¹ After life-threatening illness and upsetting ICU experiences, including the need for mechanical ventilation, the sense of dyspnea, and the experience of hallucinations, it is unsurprising that mental health problems often emerge or intensify.

Approximately 20-30% of ICU survivors develop posttraumatic stress disorder (PTSD).^{2,3} PTSD is defined by re-experiencing, avoidance, hyperarousal, and a negative impact on mood and cognition that last more than one month following a traumatic event. ICU survivors with PTSD may experience flashbacks to being on a ventilator, avoid medications or follow-up care that remind them of critical illness, become overly watchful for future medical problems, and feel disconnected from others.² These frightening reminders and looming threats often inhibit engagement in valued activities, social connections, and healthcare. Fortunately, most individuals who experience traumatic events do not develop PTSD.⁴ Accordingly, the ability to accurately forecast ICU survivors' PTSD risk is crucial to target resources toward those who need them.

With this goal of prediction in mind, the Society of Critical Care Medicine recently convened ICU survivors and 31 multi-disciplinary experts to review evidence and provide guidance on strategies for predicting and identifying PICS-related problems, including PTSD.⁵ The consensus-driven recommendations involve assessing for mental health, physical, and cognitive problems regularly, beginning within 2-4 weeks of hospital discharge, particularly among higher risk individuals. With regard to post-hospital PTSD, the group recommended prioritizing screening among those with a pre-existing psychiatric history, frightening ICU memories, and early PTSD symptoms. The Impact of Events Scale-

Revised (IES-R, 22 items)⁶ or a shorter version (IES-6, 6 items) were recommended as screening tools for post-hospital PTSD.

In this issue of *Critical Care Medicine*, Wawer and colleagues present a timely approach to PTSD symptom prediction that underscores the value of early assessment.⁷ In a single-site, prospective study of 174 adult ICU survivors, they investigated the utility of early acute stress symptom assessment for predicting PTSD symptoms 3 months after hospital discharge.

The rationale for examining acute stress symptoms builds on prior work suggesting early symptoms, 3 days to one month after a traumatic event, are risk factors for later post-ICU PTSD.^{8–10} The researchers recruited patients admitted to medical or surgical ICUs for two or more days. During the week following ICU discharge, patients were evaluated on the hospital ward, where they rated acute stress symptoms on the IES-R and the Peritraumatic Dissociative Experiences Questionnaire (PDEQ) via self-report survey or with assistance from a psychiatry clinician.

Acute stress symptoms were defined as an IES-R total score ≥ 12 , and peritraumatic dissociation was defined as a PDEQ score ≥ 15 . Self-reported PTSD symptoms were assessed 3 months later using the IES-R via telephone interview; total scores ≥ 35 were considered abnormal. The authors examined area under the receiver operating characteristic curve (AUC), sensitivity, specificity, positive and negative predictive values to determine the ability of early screening to predict PTSD symptoms at 3-months.

The study population was middle-aged (median age 62), male (71%), and 54% received mechanical ventilation. When interviewed, 64% reported a psychiatric history, a rate noticeably higher than prior post-ICU samples which often rely on clinical documentation. During the follow-up period, 14 participants died, a finding that speaks to the reality of “ICU Survivorship.” Study retention was impressive among 3-month survivors, with 91% completing the interview.

At baseline, 43% had acute stress symptoms (IES-R ≥ 12) and 48% had peritraumatic dissociation symptoms (PDEQ ≥ 15). Of the 145 survivors assessed at 3 months, 13% had above-threshold PTSD symptoms (IES-R ≥ 35), and an additional 17% had a score between 12 and 34, categorized as partial PTSD symptoms.

Overall, IES-R scores within 1 week of ICU discharge predicted PTSD symptom levels at follow-up (AUC=0.90, 95% confidence interval (CI)=0.80 to 0.99). Initial IES-R scores ≥ 12 had 90% sensitivity and 71% specificity for predicting above-threshold PTSD symptoms at 3 months. Those with lower initial IES-R scores (< 12) were unlikely to report PTSD symptoms at 3 months, with a negative predictive value of 98%. Initial IES-R scores ≥ 12 had a positive predictive value of 32%. Combining PDEQ scores with the IES-R did not improve the ability to predict PTSD symptoms at 3 months. After adjustment, pre-existing anxiety and IES-R scores in the week after ICU discharge were independently associated with PTSD symptoms at 3 months.

Wawar and colleagues' findings demonstrate that in-hospital screening can be used to inform which ICU survivors have higher risk for lasting PTSD symptoms. Specifically, those with lower initial IES-R scores were unlikely to report significant PTSD symptoms in early recovery. This information holds important value, as interventions may be less helpful for individuals with typical responses to trauma.¹¹ In the context of recent SCCM recommendations,⁵ this study suggests those with higher in-hospital IES-R scores should be among those prioritized for early PTSD screening (e.g., at 4 weeks) following hospital discharge. This would facilitate prompt referral to a mental health professional for formal assessment if symptoms are persistent or impairing.

Potential applications include using in-hospital screening to guide discharge planning discussions and follow-up care. For example, documenting early acute stress symptom levels and recommending follow-up PTSD screening in the discharge summary may increase continuity of care. For those with higher in-hospital IES-R scores, clinicians could provide patient education materials about PTSD symptoms and PICS to survivors and their loved ones and/or offer to arrange a meeting with the hospital team's mental health provider. In multi-disciplinary post-ICU clinics, these patients could be prioritized for scheduling on days when a mental health consultant is available. These approaches provide opportunities to normalize PTSD symptoms and validate their integral role during recovery, which may help patients feel less alone, more informed, and more comfortable discussing symptoms during follow-up and/or seeking mental health care if needed.

Implementation studies are needed to inform the adoption of early screening practices. Key steps include determining the current practice, capacity, and barriers to early screening, as well as availability of resources for follow-up symptom monitoring and treatment. Indeed, referrals and clear actions for positive in-hospital acute stress screens, informed by local resources, should be developed before widespread screening. Factors that increase sustainability should also be explored, such as strong collaboration and workflows connecting ICU clinicians, clinicians on wards who may conduct assessments and discharge planning, and primary care clinicians.

While this study represents an important step forward with exciting potential, there are limitations that cloud its conclusions. A methodological weakness is the absence of a gold-standard diagnostic assessment of PTSD at the outcome assessment, which would be ideal to evaluate screening accuracy. Still, the IES-R is widely used, recommended,⁵ well-validated,¹² and likely feasible for clinical practice; further, PTSD symptoms can be impairing even without meeting diagnostic criteria.² Additionally, although the threshold for follow-up PTSD symptoms appears appropriate,^{5,12} the rationale for selecting IES-R 12 *a priori* as the threshold for baseline acute stress symptoms is less clear. External validation studies are necessary,¹³ which can examine whether other IES-R thresholds have better characteristics. Other key,¹⁴ often overlapping³ outcomes (e.g., depression, anxiety) were not assessed, so it is unknown whether the IES-R screening can discriminate between PTSD and other mental health problems to inform tailored follow-up.

The study also illuminates larger questions in the field; the ideal timing for initial post-ICU psychological symptom screening remains hazy. Residual delirium is common following

ICU discharge, and can affect reliability and interpretation of self-reported data. The authors excluded 8 patients due to confusion, but a detailed cognitive assessment was not described. It is also unclear how long patients remained hospitalized after the baseline assessment. Potentially-traumatic experiences of serious illness do not abruptly end at ICU discharge; for example, delirium and pain continue on the ward, and some patients are transferred back to the ICU. A shift to studying screening in reference to anticipated hospital discharge, when patients are more medically and cognitively stable, may be warranted. Finally, prediction and screening approaches are needed for family caregivers, who likewise experience acute stress symptoms¹⁵ and long-lasting impairments after a loved one's critical illness.

In summary, Wawer and colleagues' study demonstrates that screening for early acute stress symptoms can be accomplished in the first week following ICU discharge, and early IES-R scores provided meaningful information about future PTSD symptoms. Those with IES-R scores below 12 were unlikely to show significant PTSD symptoms in the first few months of recovery. In this way, initial acute stress symptom screening may forecast which patients likely have calmer skies ahead, such that provisions (post-hospital symptom monitoring, mental health referral for formal assessment) can be directed to patients more likely to benefit. Armed with an accurate forecast, the field can better advance in developing ways to steer at-risk patients away from storms of ongoing PTSD symptoms and toward functional recovery.

Acknowledgments

Copyright form disclosure: Dr. Derry's institution received funding from National Institute on Aging (T32 fellowship AG049666 supports Dr. Derry). Drs. Derry and Mikkelsen received support for article research from National Institutes of Health.

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