

Critical Care [ALERT]

Authoritative, evidence-based summaries for the critical care clinician

SPECIAL FEATURE

Post Intensive Care Syndrome: Risk Factors and Prevention Strategies

By *Leslie A. Hoffman, RN, PhD* and *Jane Guttendorf, DNP, RN, CRNP, ACNP-BC, CCRN*

Dr. Hoffman is Professor Emeritus, Nursing and Clinical & Translational Science, University of Pittsburgh, and Jane Guttendorf is Assistant Professor, Acute & Tertiary Care, University of Pittsburgh, School of Nursing

Dr. Hoffman and Jane Guttendorf report no financial relationships relevant to this field of study.

What is post intensive care syndrome (PICS)? Each year, approximately 800,000 patients in the United States develop an illness that results in admission to an ICU and need for mechanical ventilation.¹ Most survive to hospital discharge. This transition, while positive, often begins a new, challenging phase of recovery. ICU survivors, particularly those who require prolonged mechanical ventilation, experience high mortality.² Compromises in physical, psychological, and/or cognitive function are common.¹⁻⁴ Both patients and family caregivers are at risk for symptoms of anxiety, depression, posttraumatic stress disorder (PTSD), and sleep disorders.⁵ Studies suggest that as many as 40% of ICU survivors and family members experience physical, psychological, and/or

cognitive dysfunction.²⁻⁵ Termed post intensive care syndrome, this consequence is defined as “new or worsening impairment in physical, cognitive, or mental health status arising after critical illness and persisting beyond discharge from the acute care setting.”⁶ Both patients and family caregivers may be affected, a consequence termed PICS (patient) or PICS-F (family member).⁶ This review will discuss risk factors, clinical manifestations, and strategies for prevention and management of PICS.

SCOPE OF THE PROBLEM

PICS is a common and persistent, with symptoms lasting for months to years after ICU discharge. The following is a summary of findings from selected studies that illustrate the scope of the problem:⁷

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- 85%-95% of patients with ICU-acquired weakness have symptoms that last for 2-5 years or longer.
- 74% of ICU survivors diagnosed with acute respiratory distress syndrome have cognitive impairment at ICU discharge and 25% 6 years after ICU discharge.
- 10%-50% of ICU survivors experience symptoms of depression, anxiety, PTSD, and sleep disturbance, which may persist for years.
- 50% of ICU survivors require caregiver assistance 1 year later.
- 33% of family caregivers have symptoms of depression and 70% have symptoms of anxiety.
- 33% of family members have symptoms of PTSD, which can persist for 4 years or longer.

RISK FACTORS

Commonly-cited risk factors for PICS include ICU-related factors (e.g., delirium, deconditioning, severity of illness) and pre-existing patient factors (e.g., dementia, comorbidity). Findings from the BRAIN-ICU study, which evaluated risk factors and incidence of neuropsychological dysfunction in more than 800 medical and surgical ICU survivors, indicated that 70% of patients developed delirium during the hospitalization, and longer duration of delirium in the ICU was associated with worse global cognitive and executive function at 3 and 12 months following ICU discharge.⁸ While this and other studies have identified a variety of risk factors, they are extensive in number and not particularly helpful because many critically ill patients share these characteristics.

Recent literature suggests that measures of pre-existing frailty, obtained retrospectively following ICU admission, and ICU-acquired weakness, obtained at ICU discharge, may be more predictive. This focus supports the intuitive observation that those who enter or leave the ICU with considerable deficits are at greatest risk. Bagshaw and colleagues⁹ recently explored the ability of the Canadian Study on Health and Aging Clinical

Frailty Scale, a well-validated 9-point assessment tool, to identify vulnerable patients less likely to tolerate critical illness. In this prospective multicenter study (six ICUs, 421 patients), frailty was common, affecting 33% of participants. Frail patients had longer stays in ICU and greater mortality 12 months after admission. Frail patients were more likely to experience new functional dependence at hospital discharge and worse health-related quality of life. These outcomes persisted after adjusting for demographic factors, pre-admission health status, comorbidities, and illness severity. Findings of this study are particularly interesting as a simple 9-item questionnaire was able to identify patients most likely to experience post-discharge limitations. Similar findings were reported by Hermans and colleagues¹⁰ from a study that focused on the impact of ICU-acquired weakness on recovery.

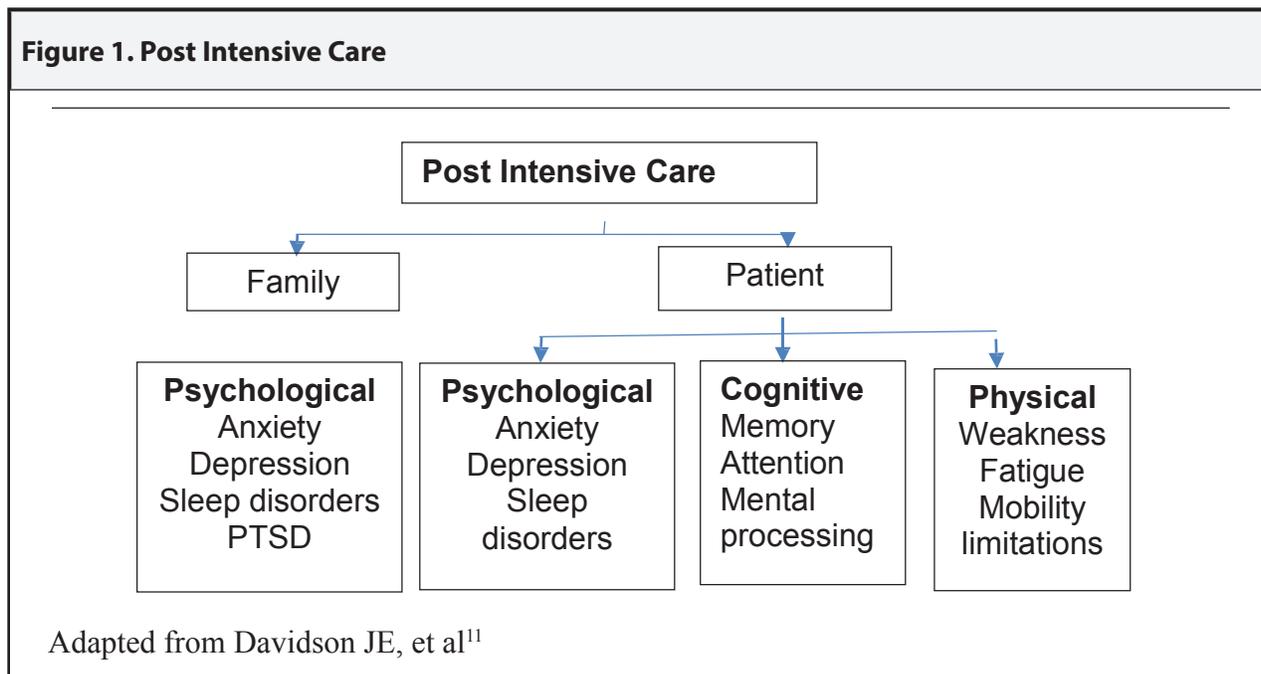
CLINICAL MANIFESTATIONS

PICS can manifest in a variety of ways. Common symptoms include fatigue, weakness, limited mobility, anxiety, depressed mood, sleep disorders, and mental processing issues (e.g., preparing a meal, remembering appointments, shopping, etc). The burden of caregiving often leads to similar psychological symptoms in family caregivers.

PREVENTION AND MANAGEMENT ABCDE BUNDLE

A consistent body of literature supports the benefits of mobility for ICU patients.¹² Achieving the goal of mobilization requires clinician acceptance of a culture of mobility and work to promote this goal by all members of the healthcare team.¹¹ The best way to achieve this goal appears to be through a protocol, such as the Awakening, Breathing, Coordination with daily sedation interruption and ventilator weaning, Delirium monitoring and management and Early ambulation when feasible (ABCDE) protocol.¹² Benefits of daily awakening to determine ability to wean from mechanical ventilation, delirium monitoring and appropriate choice of medications,

Figure 1. Post Intensive Care



Adapted from Davidson JE, et al¹¹

and early mobilization are well established and include reduced ICU and hospital lengths of stay, as well as decreased prevalence of delirium and shorter delirium duration.¹²⁻¹⁴ This is important because longer delirium duration is associated with increased odds of disability.^{8,13}

ICU DIARIES

There is increasing evidence that unpleasant or delusional memories of the ICU experience are associated with distress after ICU discharge.¹⁵⁻¹⁸ Use of an ICU diary maintained prospectively during the patient's ICU stay by family members, health care providers, or both, has been shown to decrease the incidence of PTSD when measured in randomized trials.¹⁶ It is thought that diaries assist patients in establishing factual memories, lost during their ICU stay.¹⁵⁻¹⁷ The Intensive Care Experience Questionnaire has been developed specifically for the purpose of measuring patients' recall of their experience while in the ICU and may facilitate identifying those with distressing memories.¹⁵

SUPPORT GROUPS

Support groups have been shown to be a beneficial way to increase coping skills and resilience. Provision of a time and place where family members and friends of patients can meet to support each other while they are in the ICU and patients, friends, and family members of discharged ICU patients can meet to support after ICU discharge, with group leadership by a health care team member, offers another means to support caregivers and improve outcomes.

TEAM BUILDING

Families and, at times, the bedside nursing staff may not be included in daily patient care rounds. Reasons are multiple as are the adverse effects of this practice on team spirit. Family caregivers are an essential part of care following ICU discharge and can greatly benefit from being involved in care prior to discharge.¹⁸

PUBLIC AND PROFESSIONAL AWARENESS

An extensive body of literature describes challenges faced by ICU survivors. However, recognition of the scope and persistence of these challenges is relatively recent. The term PICS was created to focus attention on problems faced by ICU survivors and their family members and promote greater awareness. A number of resources exist for patients and families, including a Society of Critical Care Medicine (SCCM) webpage that provides education and resources to assist patients/families in understanding care in the ICU and problems that may be encountered after discharge, including content specific to PICS (<http://www.mycucare.org/Adult-Support/Pages/Post-Intensive-Care-Syndrome.aspx>). Patients and families should receive specific education about cognitive and psychiatric symptoms, as well as the physical signs and symptoms that may signal PICS. As most survivors of critical illness are not cared for by critical care providers during the follow-up period, extending education about risks and detection of PICS to primary care providers is important.

SYNTHESIS

The traditional view of ICU survivorship is that it is

Table 1. Recommendations for Improving Long-term Outcomes for ICU Survivors

1. Provide high-quality acute intensive care. This should include resuscitation and initial stabilization but also evidence-based ventilator and sedation management, minimizing duration of mechanical ventilation.
2. Implement a process that enables structured assessment of pre-existing limitations and limitations that develop during critical illness.
3. Involve rehabilitation experts as early as possible. Such experts include physical therapists, occupational therapists, social workers, physical medicine, and geriatrics.
4. Provide the patient and family with education about resources that may assist in promoting rehabilitation and providing support. Recognize that patients are unlikely to seek and find resources independently.
5. Arrange close follow-up and work to avoid fragmentation of care by structured, routine hand-offs to both hospitalists and outpatient providers.
6. Find a way to get feedback on patients' long-term outcomes so team members can learn from these experiences.

an issue to be addressed after recovery from critical illness and discharge from the ICU. Current practice with stroke, trauma, and cardiac surgery patients suggests that targeted care during critical illness has the potential to reduce symptoms of PICS. Iwashyna and Netzer¹⁹ propose the steps shown in Table 1 as a means to better assist patients and families cope with the challenges faced following ICU discharge. Notably, they advise that assessment begin prior to ICU discharge, handoffs to post-ICU care providers be specific, and feedback be obtained from patients and families to aid in better addressing issues they encounter and share potential solutions.

FUTURE DIRECTIONS

Additional research is needed in many areas with regard to evaluating long-term outcomes of ICU survivors. Further characterization of the associations between potentially modifiable physiologic predictors of PICS and outcomes, evaluation of interventions to reduce the use of ICU sedation, promote earlier awakening and extubation, active assessment for and treatment of delirium, and focused interventions to promote sleep, exercise, and mobility in ICU patients are all important targets for study. Benefits of aggressive post-ICU care to promote physical recovery and restoration of muscle strength is another important area for study. Developing models of focused follow-up care of ICU survivors, which include intensivists and other multidisciplinary team members interested in specifically recognizing and treating PICS, may prove beneficial.

CONCLUSION

Critical care clinicians have the potential to improve the long-term functioning and quality of life of the increasing number of patients surviving critical illness by initiating structured interventions to assess the extent of risk, test interventions to improve outcomes, and obtain stakeholder input from all involved (critical care and non-critical care clinicians, patients, families, support services) to

affect continuous improvement. The ultimate goal is to improve the patient/family care experience during and following ICU discharge. ■

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ABSTRACT & COMMENTARY

Communicating About Prognosis in the ICU

By *Eric Walter, MD, MSc*

Pulmonary and Critical Care Medicine, Northwest Permanente and Kaiser Sunnyside Medical Center, Portland

Dr. Walter reports no financial relationships relevant to this field of study.

SYNOPSIS: Family members, clinicians, and experts agree on many key themes regarding how prognostic information should be conveyed to patient surrogates in the ICU. However, important differences of opinion exist.

SOURCE: Anderson WG, et al. A multicenter study of key stakeholders' perspectives on communicating with surrogates about prognosis in ICUs. *ANNALSATS*, 2014; [Epub ahead of print]

Effectively communicating a prognosis to a patient's surrogates in the ICU can be challenging. Clinical guidelines exist but are based on low-level evidence and expert opinion. Family and friends, members of the care team, and others may have different perspectives on how prognosis should be conveyed to surrogates. In this article, Anderson and colleagues solicited input from these groups as well as "experts" in an effort to understand how participants thought prognosis should be communicated to surrogate decision makers.

The authors performed semi-structured interviews with surrogate-decision makers for adult ICU patients at high risk of death or severe disability. All surrogates had already had at least one discussion regarding prognosis with the patients' physicians. The authors also interviewed the patients' physicians and non-physician clinicians (nurses, social workers, and chaplains). To be eligible, physicians had to have already had a prognostic discussion with an eligible surrogate. Non-physician clinicians had to have witnessed or participated in such as discussion. Finally, they also interviewed people they considered to be experts in fields such as health communications, ethics, geriatrics, health care disparities, palliative care, psychology, critical care, and others.

One-hundred forty-two interviews were conducted with 118 participants. Most participants were surrogates (47). There were 17 physicians, 28 non-physician clinicians, and 26 experts. There was agreement between participants from all groups with respect to the importance of a truthful prognosis, showing compassion, tailoring the discussion depending on family needs, and checking for understanding. These themes are all part of current published guidelines regarding how prognosis should be communicated. In addition to these topics, some new themes arose from these interviews. Nearly all participants (96%) discussed the importance of ensuring that all members of the treatment team were aware of, and conveying, the same prognosis. Helping families see the prognosis for themselves was discussed by 71% of participants (79% of surrogates). The use of drawings, pictures, or sharing radiographs was recommended and bedside discussions of the treatments patients were receiving was described as helpful. However, families often felt uncomfortable discussing prognosis at the bedside where patients may overhear the discussion.

The authors did find some themes where different groups disagreed. Most participants agreed that an early discussion of the possibility of a poor outcome was important. However, only 43% of

surrogates agreed that the prognosis should be discussed regularly over the course of the ICU stay. This contrasted with > 75% of participants in the other groups. Also, most surrogates, non-physician clinicians, and experts supported the use of numeric estimates of prognosis, while only 12% of physicians supported this idea.

■ COMMENTARY

Communicating a poor prognosis is something all of us do every day in the ICU. It is a skill, not unlike placing a central line, honed over years of practice. However, procedural skills improve with the benefit of nearly instant feedback, whereas we rarely receive feedback on how well we are communicating a poor prognosis. Anderson and colleagues should be commended for helping to describe some of this feedback by eliciting recommendations from surrogates and non-physician clinicians in this study.

A strength of the study was the establishment of new key themes agreed upon by all stakeholders as elements of effective prognostic communication. As important, however, was the identification of themes that were not agreed upon as being effective communication (i.e., the use of numeric estimates).

A limitation of this study was generalizability. These results came from a relatively small sample of participants drawn from three large academic medical centers. It is not clear if these results are generalizable to prognostic discussions in other ICU settings. Furthermore, these medical centers have all previously led research on ICU communication. It seems very likely that many of the themes discussed by physicians and clinicians at these hospitals were based on results of previous research at that institution. For this reason, it is not surprising that there was such widespread support for published practice guidelines. Another potential limitation was the inclusion of national experts. A significant proportion of participants interviewed (22%) were experts. Since one motivation for the study was that many current guidelines are based on expert opinion only, it seems somewhat circular to have solicited expert opinions in this study.

Despite some limitations, results from this study should be welcomed. They add to our understanding of the many layers of effective prognostic communication. Future studies should examine these discovered themes in a more prospective manner and in a wider patient population. ■

ABSTRACT & COMMENTARY

The Quandry Over Preventing Delirium in Acute Respiratory Distress Syndrome

By *Richard Kallet, MS, RRT, FAARC, FCCM*

Director of Quality Assurance, Respiratory Care Services, San Francisco General Hospital

Mr. Kallet reports no financial relationships relevant to this field of study.

SYNOPSIS: Both ARDS and mechanical ventilation (MV) are independently associated with delirium, and the presence of delirium in patients with ARDS strongly influences mortality.

SOURCE: Hsieh SJ, et al. The association between acute respiratory distress syndrome, delirium, and in-hospital mortality in intensive care unit patients. *Am J Respir Crit Care Med* 2015;191:71-78.

This prospective, observational study of 564 adult, medical-surgical intensive care unit (ICU) patients at two urban academic hospitals investigated: 1) whether acute respiratory distress syndrome (ARDS) is associated with a higher prevalence of delirium compared to non-ARDS respiratory failure; and 2) the effect of delirium on the relationship between ARDS and hospital mortality. The study sample was divided into three cohorts: ICU patients who never required

mechanical ventilation (MV) (n = 198), those who needed MV but never developed ARDS (n = 318), and those requiring MV for ARDS (n = 48). Delirium developed in 43% of patients and was associated with older age, increased number of comorbidities, severe sepsis, higher illness severity scores, as well as a history of dementia, alcohol, and drug abuse. As anticipated, delirium was also linked to usage of opiates, benzodiazepines, and steroids in the ICU.

A significantly higher incidence of delirium and persistent coma was found in the ARDS cohort (73% and 19%, respectively) compared to the intubated, non-ARDS cohort (52% and 7%) and ICU patients who never required MV (21% and 0.5%) ($P < 0.001$). After adjusting for multiple covariates including age, dementia, alcohol abuse, comorbidities, severe sepsis, steroid and sedative use, the presence of ARDS carried a seven-fold higher risk for delirium compared to a two-fold higher risk in those on MV without ARDS. Most importantly, adjusting for the presence of delirium and persistent coma in the ARDS cohort reduced the odds ratio for hospital mortality from 10.44 (95% CI, 3.16-34.50, $P < 0.001$) to 5.63 (95% CI, 1.55-20.45, $P = 0.009$).

■ COMMENTARY

This study suggests that prospective studies will be required to assess whether reducing delirium in ARDS improves mortality. ICU delirium occurs in 60-80% of patients requiring MV with an estimated mortality risk of 10% per day of delirium.¹ However, a recent meta-analysis of randomized clinical trials did not find an association between reduced delirium duration and mortality.² Therefore, we should be cautious when modifying therapies proven to reduce mortality in ARDS in order to reduce the perceived mortality risk associated with delirium.

Most importantly, interventions that reduce ICU delirium (e.g., targeted light sedation, daily sedation interruptions, spontaneous breathing trials) may not be appropriate in severe ARDS. Under these circumstances, strict lung protective ventilation (LPV) is imperative as low tidal volumes (V_T) and higher positive end-expiratory pressures (PEEP) reduce lung stress and strain, repetitive shear injury, and oxygen toxicity that intensify the inflammatory response to severe infection or injury.

The authors justifiably stress that reducing “modifiable” risk factors for delirium in ARDS necessitates further prospective research. However, what, how, and in whom those factors are tested presents a nettlesome problem.

LPV often requires a set V_T below that targeted by patients in severe distress because of numerous stimuli including hypoxemia, acidosis, irritant receptor firing, and the effects of loaded breathing. Exaggerated breathing efforts stymie effective ARDS management by increasing alveolar edema formation (from vigorous negative intrathoracic pressures), countering the effectiveness of PEEP (from intense, expiratory muscle recruitment), and magnifying intrapulmonary shunt (from the effects of increased oxygen consumption). The importance of controlling these factors are implied both by evidence that mortality in ARDS is dependent on the ability to clear alveolar edema and meta-analyses showing that lower V_T , higher PEEP, paralytics, and prone positioning reduce mortality in severe ARDS.

However, liberalizing LPV targets may be appropriate for some patients with mild or moderate ARDS. In relatively severe ARDS, the incidence of stretch-related injury increases substantially above 8-9 mL/kg.¹ On the other hand, stable ICU patients on MV appear to tolerate increased breathing exertion of at least twice normal. Therefore, clinically stable patients with ARDS may tolerate some combination of increased breathing exertion and judiciously increased VT that might reduce the apparent mortality risk associated with delirium. To further improve outcomes in ARDS, we need well-designed clinical trials that enlighten us as to the risks of favoring one paradigm over another, in clearly defined clinical situations. Hsieh and colleagues are to be commended for bringing this important issue to light. ■

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CME QUESTIONS

- 1. Post intensive care syndrome (PICS) has been defined as a constellation of problems encountered by survivors of critical illness that persists after ICU discharge and may include:**
 - a. new or worsening cognitive, physical, psychological, or emotional dysfunction.
 - b. inability to recall specific events during the ICU stay.
 - c. symptoms of delirium on 5 or more ICU days.
 - d. inability to stand independently at hospital discharge.
 - e. all of the above
- 2. In the study by Davydow et al, substantial PTSD symptoms during ICU hospitalization were associated with:**
 - a. increased risk of future depressive symptoms.
 - b. increased risk of repeat hospitalization within 1 year of discharge.
 - c. increased risk of unemployment after hospital discharge
 - d. increased usage of psychiatric medication after hospital discharge.
 - e. increased risk of outpatient visits for sleep disorders.
- 3. Surrogate decision makers for critically ill patients:**
 - a. often felt uncomfortable having discussions regarding patient prognosis in the room where patients may overhear the discussion.
 - b. often disagreed with the patient's physician.
 - c. did not express an interest in hearing numerical estimates of prognosis.
 - d. did not want physicians to be truthful when the prognosis was poor.
 - e. preferred to hear different estimates of prognosis from different members of the treatment team.

CME OBJECTIVES

Upon completion of this educational activity, participants should be able to:

- identify the particular clinical, legal, or scientific issues related to critical care;
- describe how those issues affect physicians, nurses, health care workers, hospitals, or the health care industry; and
- cite solutions to the problems associated with those issues.

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Post-ICU Stress Symptoms Are Associated with Increased Acute Care Utilization for at Least 1 Year

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