

Preventing Chronic Critical Illness and Rehospitalization

A Focus on Sepsis

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KEYWORDS

• Sepsis • Infection • Respiratory aspiration • Patient readmission

KEY POINTS

- Patients are at high risk for further health deterioration and hospital readmission following sepsis and other critical illnesses.
- The top 5 potentially preventable causes of hospital readmission following sepsis are infection, congestive heart failure, acute renal failure, chronic obstructive pulmonary disease exacerbation, and aspiration.
- Medication errors, volume overload, and aspiration are 3 common, preventable complications that may contribute to intensive care unit or hospital readmission after sepsis.
- Early outpatient treatment after sepsis should focus on mitigating the risk for infection, aspiration, and other common setbacks as well as promoting functional recovery.

INTRODUCTION

Survival from critical illness has improved substantially over the past few decades, such that most patients now survive to hospital discharge. For example, across intensive care units (ICUs) in Australia and New Zealand, in-hospital mortality from sepsis has declined from 35% in 2000 to 18% in 2014.¹ Similar improvements in short-term mortality have been seen in the US Veterans Affairs health care system² as well as in the control arms of clinical trials.³ Worldwide, an estimated 19 million patients are hospitalized with sepsis each year and 14 million survive.⁴

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As acute survival from critical illness has improved, however, it has become increasingly clear that patients often acquire new impairment during hospitalization for sepsis and other critical illnesses,⁵ described as “Post-Intensive Care Syndrome”⁶ or “Post-Sepsis Syndrome.”⁷ For example, in a nationally representative sample of older Americans hospitalized for sepsis, the average patient acquired 1 to 2 new functional limitations surrounding sepsis hospitalization.⁸ In addition, there was a near tripling in the prevalence of cognitive impairment, from 6% before sepsis to 16% after sepsis in this cohort.⁸ Mental health impairments (eg, anxiety, depression, posttraumatic stress disorder) are likewise common in patients after critical illness,^{9–11} but the extent to which they are caused or exacerbated by sepsis is less well established.¹²

MEDICAL SETBACKS AND HOSPITAL READMISSION

Beyond the new physical disability and cognitive impairment that is commonly acquired among patients surviving sepsis and other critical illnesses, survivors are also vulnerable to further medical setbacks in the weeks to months following resolution of sepsis.¹³ Hospital readmission after sepsis is common, ranging from 18% to 26% at 30 days and 25% to 43% at 90 days,^{14–17} with many patients experiencing multiple readmissions (**Table 1**). These readmissions are ominous events, as they are associated with a high rate of death or transition to hospice.¹⁸ Intuitively, it makes sense that an early setback resulting in hospital readmission sets the stage for a failed recovery, whereas patients who are able to stay out of the hospital for at least a few weeks are more likely to have a good recovery.

Importantly, there is some evidence that postsepsis readmissions are potentially modifiable. More than 1 in 5 older Americans has a potentially preventable hospital readmission (ie, a readmission for an “ambulatory-care sensitive condition”) within 90 days of sepsis discharge, suggesting that the rate of hospital readmission could plausibly be reduced with better discharge and follow-up care.¹³

In addition to hospital readmission, patients also experience a high rate of death in the 2 years following sepsis hospitalization.¹⁹ Some, but not all, of these late deaths are explained by age, preexisting comorbid disease, and risk factors that predisposed patients to developing sepsis in the first place.²⁰ However, 1 in 5 older Americans has a late death not explained by their health status before sepsis.¹⁹ And although observational human studies cannot prove a causal association between sepsis late mortality, experimental studies suggest several plausible mechanisms by which this may occur. Mice who survive sublethal sepsis experience impaired tumor suppression (increased risk for cancer),²¹ impaired bacterial and fungal clearance (increased risk for recurrent infection),^{22–24} and accelerated progression of atherosclerotic disease²⁵—all of which could plausibly increase the risk for subsequent mortality.

Recurrent Infection and Sepsis

The most common reason for hospital readmission after sepsis is infection—often another episode of sepsis. The risk for recurrent sepsis is elevated 9-fold relative to carefully matched population controls,²⁶ and the risk for 90-day readmission for sepsis is elevated more than 2-fold over similar patients surviving hospitalization for other causes.¹³ Most commonly, recurrent sepsis hospitalizations are due to a new infection, not relapse or recrudescence of the initial infection.²⁷ The high risk for recurrent sepsis is multifactorial, due to both preexisting risk factors (age, comorbidities, frailty) as well as ongoing derangements to the immune system that persist following sepsis.^{28,29} In addition, the risk for recurrent sepsis is thought to be further heightened

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