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Increasing Vulnerability in Older Adults With Critical Illness



Implications for Clinical Care and Research

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First foretold more than 20 years ago, and accelerated by the COVID-19 pandemic, the effects of an aging US population on critical care medicine are now evident.¹ As a specialty, we have made strides to understand the implications of an aging population across the continuum of critical illness and survivorship. Today, we recognize how older adults are affected differently than their younger counterparts, adjusting our treatments such as medication dosing, resuscitation strategies, and mechanical ventilator parameters.² Geriatric syndromes such as delirium and immobility are part of the vernacular.³ We have begun to understand the role critical illness plays among survivors in the development or exacerbation of geriatric syndromes, including cognitive and physical impairments and disabilities in activities of daily living.⁴ However, despite our efforts to alter the course of these syndromes in the ICU and subsequently, data from interventional trials are neutral,⁵ suggesting our understanding of these syndromes is incomplete.

To help inform our understanding of geriatric syndromes during critical illness and afterward, we must learn from those who have studied their development in

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other contexts. An informative model, known as the vulnerability hypothesis, may help us to close these knowledge gaps. First proposed 25 years ago by delirium researcher Dr Sharon Inouye to conceptualize the factors related to the development of delirium (and subsequently applied to other geriatric syndromes), the vulnerability hypothesis states that geriatric syndromes develop as a function of a patient's baseline vulnerability (ie, predisposing factors) in the context of a physiological stressor/insult (ie, precipitating factors).^{6,7} To date, much of the ICU research has focused on the effects of precipitating factors on outcomes. Although studied to some extent, the role of predisposing factors that contribute to baseline vulnerability in a patient with critical illness is not well defined.

Because the presence of one geriatric syndrome increases the chances of developing others, identification of pre-existing geriatric syndromes can serve as a means by which to understand better baseline vulnerability. In this issue of *CHEST*, Cobert et al⁸ describe the scope with which geriatric syndromes are present among older adults prior to ICU admission and how the prevalence of these syndromes has changed over time. Using data from the Health and Retirement Study (HRS), a nationally representative, longitudinal study of older adults, the authors identified > 20,000 participants aged ≥ 65 years whose HRS data were linked to Medicare claims data. Of these, 6,000 were admitted to an ICU during the 17-year study period. Using the every-other-year HRS assessments of health status, physical function, and cognitive function, the authors identified the presence or absence of four geriatric syndromes: disability, dementia, frailty, and multimorbidity. During the study, the adjusted prevalence of disability increased from 15% to 24%, frailty increased from 37% to 45%, and multimorbidity increased from 54% to 72%. The adjusted prevalence of dementia remained flat, however, with a nonsignificant increase from 10% to 13%. Specific disabilities driving the increased prevalence were those related to eating, toileting, dressing, and transferring out of bed. Frailty was primarily driven by increases in the number of falls.

The findings from this well-conducted study⁸ that included a diverse population of older adults are important for several reasons. First, the finding that

nearly 30% of overall HRS participants were admitted to the ICU provides novel data about the extent to which older Americans are affected by critical illness. Because the number of older Americans is projected to continue to increase for the next 30 years or more,⁹ these data make clear the ongoing importance of aging-focused research and clinical care. Second, the increased prevalence of disability, frailty, and multimorbidity shows that older adults being admitted to the ICU today are more vulnerable than those admitted in the past. Moreover, because the average age of those admitted to the ICU only changed by 1 year during the study, these data show that increases in vulnerability are not simply due to chronological age, and they suggest that to identify those with greater baseline vulnerability, screening for geriatric syndromes at ICU admission may be warranted. Third, the high prevalence of pre-existing geriatric syndromes indicates a population who is highly vulnerable to developing additional (or worsening of existing) geriatric syndromes when faced with even minor stressors. This drives home the importance of reducing iatrogenic harm through the use of proven strategies proven such as the ABCDEF bundle.¹⁰ Finally, although calls have made for deploying strategies to improve care for older adults in the ICU,¹¹ the bottom line is that data supporting the use of such geriatric care models are limited. The findings from this study stress the urgency with which research to define best methods to care for older adults with critical illness should be conducted.

The findings of this study⁸ indicate the need for additional research related to the broader context of pre-critical illness vulnerability. For example, because these data were collected up to 2.5 years prior to an ICU admission, the development of standardized, reliable, and proxy-validated clinical methods is needed to identify the presence and severity of disability, frailty, and cognitive impairment, which can be used in those who are emergently admitted to the ICU. In addition, we need to advance understanding of pre-critical illness vulnerability from a biological perspective. For example, well-defined biological processes of aging contribute to age-related vulnerability and occur at variable rates among individuals.¹² Thus, those with older biologic age (relative to their chronological age) at ICU admission may have greater biological vulnerability. Further study at the intersection of biological vulnerability and critical illness will allow for the identification of high-risk patients and drive an understanding of the underlying mechanisms of critical illness outcomes. Finally, as emerging data highlight the importance of social factors

on health, an understanding of the contribution of social vulnerability to outcomes during acute critical illness and afterward is needed.¹³

Through this important study, Cobert et al⁸ highlight key trends in geriatric syndromes among older adults admitted to the ICU. In so doing, they have shown us the growing vulnerability present in today's older adults with critical illness. Moving forward, we need to better define baseline vulnerability, in its many forms, to enhance our understanding of geriatric syndromes across the continuum of critical illness and survivorship.

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