

ICU nutrition: Bracing for the silver tsunami

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The global population's life expectancy is growing with a steady increase in the proportion of older patients admitted to the intensive care unit (ICU).¹ Up to 13% of the ICU patients are above the age of 80.² Older critically ill patients have lower physiological reserves of the various organ systems, as well as impaired immunity.³ This presents unique challenges in managing these patients as they are more susceptible to critical illness, with a higher risk of poor outcomes. Malnutrition, which affects 12–45% of hospitalised older patients, is one of the risk factors that contribute to higher mortality.⁴ It can lead to frailty, defined as an individual's innate vulnerability that makes overcoming and recovering from acute stress more difficult.⁵ Frail patients were present in 43.1% of one multicentre European ICU cohort of 5,021 patients with a median age of 84 years, and being frail was an independent predictor of 30-day ICU mortality (hazard ratio 1.54, 95% confidence interval 1.38–1.73) compared with non-frail patients.⁶ Malnutrition also contributes to sarcopenia, which is a progressive loss of skeletal muscle mass, strength and power.⁵ The presence of sarcopenia, when paired with the rapid loss of skeletal muscle experienced by older ICU patients as a result of immobility, dysregulated host immunity, and systemic inflammation, frequently results in the development of ICU-acquired weakness and protracted weaning from the ICU and mechanical ventilation.³

Given the differences in physiology and clinical characteristics of older patients, it may be difficult to extrapolate adult ICU nutrition guidelines to this group of patients. Hence, it is timely that in this issue of the *Annals*, Lee et al. performed a scoping review to examine the extent of the research publications related to the nutrition therapy of older critically ill patients, summarised the key research findings, and identified research gaps in this area.⁷ The authors identified 6 areas of interest: nutrition screening and assessments; muscle mass assessment; route or timing of nutrition therapy; determination of energy and protein requirements; energy and protein intake; and pharmaconutrition. One of the key findings was the

paucity of large randomised control trials (RCTs) in elderly patients that could inform decision-making for the ICU team. Only 5 RCTs were identified from the 4,689 references retrieved using the described search strategy. The authors found that the subjective global assessment and the modified nutrition risk in critically ill (mNUTRIC) can be considered to assess malnutrition risk in older critically ill patients. Other nutrition assessment tools were either not validated among critically ill patients (e.g. Nutrition Risk Screening 2002), or in the case of controlling nutritional status index (CONUT), prognostic nutritional index (PNI), geriatric nutritional risk index (GNRI), and Onodera's prognostic nutritional index (OPNI), contain components (such as serum albumin and lymphocytes) that may be confounded by the inflammatory stress response in the ICU. Direct measurements of the muscle mass using imaging may seem intuitive since skeletal muscles reflect the patients' nutritional status; however, it is uncertain if the clinical and functional outcomes may be altered by a nutrition intervention individualised based on muscularity status. In addition, due to limited evidence, the authors conclude that recommendations regarding the route and timing of nutrition therapy in older critically ill patients should be no different from those of general critically ill patients. The use of indirect calorimetry or age- and population-specific predictive equations may be considered for determining the energy and protein requirements of older ICU patients. These older patients may need higher protein than younger ones in order to achieve nitrogen balance, but may be at higher risk of azotaemia. Finally, the authors did not find any change in clinical outcomes associated with the use of glutamine and fish oil in older ICU patients.

Credit must be given to Lee et al. for systematically searching the literature and reporting the results using a scoping review strategy, something that has not been done to date. The search was exhaustive, transparent, and the results were presented according to the various themes in a structured manner while following the PRISMA extension for scoping review checklist.⁸ It

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is worth mentioning some of the important differences between a scoping review and a systematic review. Systematic reviews adhere to structured and pre-defined processes that require stringent methodologies to produce reliable and meaningful results. They are widely used to inform the establishment of clinical practice guidelines.⁹ In contrast, scoping reviews are broad and exploratory in nature. They evaluate the extent of the available evidence, identify knowledge gaps, clarify ideas and concepts, investigate research conduct, and may serve as a platform for identifying specific questions for future systematic reviews.⁹ Notably, scoping reviews typically do not address methodological limitations or the risk of bias in the available evidence, resulting in limited implications of the results for clinical practice.⁹

This review is not without limitations. Due to the wide range of topics related to ICU nutrition, it was impossible to have a complete review of all aspects of ICU nutrition in a single publication. There are other topics that may be of interest to the ICU healthcare providers, such as the risk of refeeding syndrome and the utility of thiamine in these patients, fluid and electrolyte therapy, glycaemic control, monitoring of feeding tolerance, and specific interventions that may address sarcopenia. There is also a significant bias in the post hoc analysis when the authors realised there were limited ICU studies that recruited older patients, and decided to report studies with subgroup analyses of older versus younger patients in “those that were known to the authors” on top of those eligible studies. Furthermore, it is debatable if merely being older is a granular enough phenotype to guide personalised nutrition in critically ill patients. Given the significant heterogeneity among older patients,¹⁰ perhaps the use of novel biomarkers, such as gut microbiome diversity, proteomic and

metabolomic assays, will allow us to be more precise in the delivery of ICU nutrition in the future.¹¹

Despite these limitations, Lee et al. have mapped the available evidence on nutrition therapy in older ICU patients. Hopefully, this will spur future research studies and guidelines to help personalise nutrition in this particularly vulnerable group of critically ill patients.

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