

# Implementing Nutrition Guidelines in the Critical Care Setting

## Is It a Worthwhile and Achievable Goal?

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**C**ONSISTENTLY AND REPEATEDLY, OVER TIME AND across settings, observational studies have documented the inabilities of critical care practitioners to adequately feed critically ill patients.<sup>1-3</sup> Critically ill patients who receive less nutrition are more likely to experience increased complications, prolonged mechanical ventilation, longer time in the intensive care unit (ICU), and an increased risk of death.<sup>4</sup> Patients who survive their critical illness often emerge in a weak and disabled condition that requires months to rehabilitate.<sup>5</sup> Several randomized controlled trials (RCTs) and meta-analyses of RCTs suggest that strategies to improve the enteral delivery of calories reduce complications and improve survival.<sup>4</sup> However, preliminary data from an international observational study suggest that wide variation in ICU feeding practices persists.<sup>3</sup> Thus, efforts to improve the provision of calories and protein to critically ill patients are warranted.

During the past 2 decades, there have been significant advances in understanding the role of nutrition in the treatment of ICU patients. Fifty years ago, when artificial nutrition was first developed, it was conceived as supportive care entailing administration of metabolic support while the patient recovered from his or her underlying illness. During this era, few large-scale trials informed nutrition practice, and there was little expectation that nutrition affected clinically important outcomes. Since 1980, the conduct of nearly 200 randomized trials, involving thousands of critically ill patients, has increased the evidence base by demonstrating the benefits of various nutrition practices. These benefits include significant reductions in length of stay, infectious complications, and mortality.<sup>6</sup>

Undoubtedly some positive effects attributed to the provision of nutrition are owing to the prevention of malnutrition. But nutrition also may exert effects beyond the correction of nutrient deficiencies by directly supporting the immune system, attenuating oxidative stress, maintaining gastrointestinal tract structure and function, and modifying the inflammatory response.<sup>7</sup> Accordingly, the role of nutrition in patient care has transitioned from supporting pa-

tients while they recover from their underlying illness to modulating their disease response and improving their chances of survival. Thus, it is no longer appropriate to speak of "nutrition support" but rather "nutrition therapy."

However, despite this increase in understanding and the evolution of nutrition as primary therapy, many fundamental questions regarding how to optimally feed critically ill patients remain unanswered.<sup>4</sup> Historically, most trials tested nutritional strategies in critically ill patients and those undergoing elective surgery together, but because the underlying pathophysiology of these subgroups is different, it is difficult to detect effects in homogenous subgroups of critically ill patients. In addition, the poor methodological quality and small sample sizes of many of these studies hampered the ability to detect significant differences in clinical end points. Therefore, this increase in evidence surrounding nutrition therapy has also been associated with much controversy. Moving forward, some of this controversy may be resolved by the conduct of large, rigorously designed RCTs currently underway and powered to detect differences in mortality.<sup>8,9</sup>

Building on this emerging evidence from clinical trials, several clinical practice guidelines (CPGs) that focus on nutrition therapy in mechanically ventilated critically ill patients<sup>10-13</sup> have been developed. These CPGs are intended to assist critical care practitioners in managing the rapid proliferation of new information and in making informed decisions regarding feeding their patients. In this issue of JAMA, Doig and colleagues<sup>14</sup> report the results of their study designed to improve the practice of nutrition in 27 Australian ICUs through the development and implementation of an evidence-based CPG for feeding. The thrust of the CPG was to promote earlier initiation of feeding and a greater frequency of days in which prescribed nutritional goals were met. The investigators performed a cluster RCT in which the CPG dissemination, consisting of 18 different strategies to change local practice, was randomly allocated to half the sites. The authors' hypothesis was that, by improving nutrition practice, patient mortality would be reduced by 8%.

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The study demonstrated that the intervention led to earlier initiation of feeding and to an increased number of days on which prescribed nutritional goals were met. However, the authors were unable to demonstrate an improvement in clinical outcome. These results are somewhat disappointing and prompt reflection on possible explanations. Existing guidelines recommend starting enteral nutrition within 24 to 48 hours, so shifting the average time to initiation of enteral nutrition from 1.37 days (32.9 hours) to 0.75 days (18 hours) may not be a large enough effect to influence clinical outcomes. Moreover, practices in both treatment groups were within recommended limits, with 95% of patients in both groups fed by 1.6 days after admission.

Some studies of nonnutrition guideline implementation conducted in the ICU setting show that it is possible to improve the processes and outcomes of caring for critically ill patients as well as to reduce the costs of such care.<sup>15,16</sup> However, nutrition guidelines have been disappointing. Following the early promise of a feeding guideline study in Ontario, Canada,<sup>17</sup> that reported improved compliance as well as reduced mortality, a larger cluster RCT failed to demonstrate improved compliance with a nutrition CPG and no change in outcome.<sup>18</sup> In the current study by Doig et al,<sup>14</sup> feeding improved but perhaps not enough. What can be learned from these complicated, time-consuming, expensive studies? What are the next steps in research?

It appears that many clinicians may have naively underestimated the complexity of successfully implementing nutrition guidelines. As in the present study, the majority of guideline implementation trials to date have evaluated multifaceted interventions, with the underlying hypothesis that the delivery of a combination of 2 or more strategies is more effective than a single intervention. However, this does not appear to be the case, because Grimshaw et al<sup>19</sup> reported no differences between the effectiveness of multifaceted and single-faceted interventions in their recent systematic review. These authors concluded that the choice of intervention in future studies should be informed by theoretical frameworks of behavioral change and be designed to address identified barriers and enablers. In the trial by Doig et al,<sup>14</sup> guideline ICUs self-selected subsets of the 18 proposed interventions that they believed overcame the barriers at their local site. Because this selection process was not formally evaluated, the generalizability of this intervention is limited as it is not clear which intervention was most effective at changing practice. Furthermore, the reproducibility of the study intervention in other settings may be limited by the fact that a dietitian and intensivist from each intervention ICU participated in the guideline development process, and thus this level of personal involvement may be impossible to simulate outside the context of such a trial.

Success or failure of guideline implementation strategies is determined by a complex interaction of multiple factors that act as barriers or enablers.<sup>20</sup> These factors may be as-

sociated with the guideline, the type of implementation process adopted, the characteristics of the institution, the intent of the critical care practitioner to change practice, and the clinical condition of the patient. Identifying these barriers and enablers to guideline implementation should be an integral part of future quality-improvement initiatives, informing the focus, mode, and recipients of intervention strategies. While Doig et al<sup>14</sup> have made significant efforts to improve nutrition practice in the critical care setting, it is only through tailoring interventions to address identified barriers that change ultimately will occur and optimal nutrition will have positive effects on the morbidity and mortality of critically ill patients.<sup>21</sup> The design of future studies will be strengthened by inclusion of barrier assessment and by aligning the intervention with the complexity of the critical care environment.<sup>20,22</sup>

International observational studies have identified considerable gaps between recommended and actual nutrition practices<sup>3</sup> and have highlighted opportunities for improving the provision of nutrition therapy. The observations that these gaps do not exist across all ICUs, and that some sites are able to adhere to the recommendations in daily practice, provide compelling evidence that the translation of evidence in the form of CPGs into nutrition practice is an achievable and worthwhile pursuit.

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