

## THE RESPONSE OF CRITICALLY ILL PATIENTS TO NUTRITIONAL SUPPORT

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Nutritional support is widely accepted as an integral part of the management of patients who are in an intensive care unit (ICU) for more than a brief period. In this issue (pages 212 to 219), Phang and colleagues studied 45 critically ill patients to determine whether changes occurred in several parameters that are usually considered to reflect nutritional state, and whether any such changes were related to energy balance and fluid balance. The patients were heterogeneous in terms of diagnosis, nutritional status and severity of illness. Nutritional support was provided in accordance with the best current standard: the enteral route was preferred to parenteral administration; resting energy expenditure was measured and calorie administration was calculated to meet and not exceed it; and protein was provided in appropriate amounts. Despite the care with which such support was given, Phang and colleagues found that changes in traditional nutritional markers and body composition were not specific indicators of the adequacy of that support, and the death rate was not diminished among patients in whom nutritional markers improved. These observations raise several questions relevant to the nutritional management of ICU patients.

- Are there other markers of nutritional status superior to the traditional ones? The goals of metabolic and nutritional care of critically ill patients are: to maintain body cell mass, muscle mass, strength and mobility; to support the accelerated substrate and energy demands necessary to optimize host defence and wound repair, to minimize morbidity and mortality; and to accelerate and maximize functional recovery. Unfortunately, there is no single anatomic, biochemical or functional correlate of nutritional state or of the adequacy of nutritional support. Assessment of body composition by bioelectrical impedance analysis has not gained wide acceptance in acutely ill patients, although it has been available for a number of years and is relatively easy to perform in the clinical setting. Indeed, the work of Schroeder, Christie and Hill,<sup>1</sup> cited by Phang and colleagues, reported disappointingly large discrepancies in the estimation of changes in total body water (related to lean body mass) in a large number of surgical patients. More reproducible and sophisticated measures of body composition use a variety of approaches, but none is particularly suited to routine clinical use. Objective tests of neuromuscular, immunologic or other functions to which nutritional state may be relevant are

nonspecific, may be cumbersome or difficult to perform and have not been adopted in clinical practice. Subjective Global Assessment is a clinical technique that evaluates abnormalities in food intake, digestion and absorption, strength and activity, and body composition. Assessments are consistent among different observers and correlate with outcome.<sup>2</sup> However, its applicability to critically ill patients and its role in the assessment of responses to nutritional support are undefined.

- What is the purpose of nutritional markers in clinical practice? Critically ill patients are much more likely to experience complications of nutritional support than are patients who are less ill. The consequences of overfeeding in such patients, for example, include hyperglycemia and hyperosmolarity, increased carbon dioxide production and minute ventilation, hyperlipidemia, and increased catecholamine elaboration. Energy administration to critically ill patients should increase gradually, as tolerated, to meet but not exceed energy expenditure and usually derives from a combination of energy sources. Thus, monitoring of nutritional support in the ICU is directed primarily at identifying and avoiding toxicity, rather than allowing increasing nutrient administration with nutritional markers as end points.

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• Was nutritional support effective in the patients reported and the markers examined simply insensitive or nonspecific? The confounding effects of changes in hydration, the presence of inflammation and sepsis, and other factors on nutritional parameters are well recognized and are discussed by Phang and colleagues. The limited clinical benefit of conventional nutritional support in critically ill patients is suggested by the observation that the group of patients who had an increase in serum prealbumin level had an equal or higher death rate than those who did not. The death rate in this group was reported to be 44%, and it would be quite optimistic to expect nutritional support to have more than a limited impact on survival or even nutritional markers, given the overwhelming severity of their illnesses. Although death rate was not the principal outcome of interest in the study and detailed information was not provided, the influence of nutritional support may be more apparent among patients who survive to be discharged from the ICU, that is,

when the impact of relatively acute, severe conditions has subsided.<sup>3</sup> Thus, it is not clear from the data presented that nutritional support was beneficial in these patients. Indeed, most arguments favouring nutritional support in critically ill patients are intuitive, and unequivocal data documenting improvements in morbidity or mortality with current approaches are scarce.<sup>3,4</sup> Even metabolic benefits may be difficult to achieve in the critically ill. Substantial losses of body protein have been described in septic patients despite the use of aggressive nutritional support.<sup>5</sup>

Although often challenging to complete in the intensive care unit, studies of nutritional support are essential to further our understanding of the altered metabolism of critical illness, the effects and limitations of current nutritional support techniques, and appropriate markers and goals for nutritional therapy. Modifications of conventional nutritional care (including increased supplementation of vitamins, trace elements, arginine and glutamine, and alterations in lipid

preparations) and the use of adjunctive therapies such as growth hormone may provide the benefits that have been so elusive.

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