



What are the Main Aspects of Nutritional Therapy for Patients Hospitalized with Covid-19?

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Received: July 25, 2023

Published: August 01, 2023

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Coronaviruses cause respiratory and intestinal infections in humans and animals; the majority of coronavirus infections in humans are caused by species of low pathogenicity, leading to the development of symptoms of the common cold, however, they can eventually lead to serious infections in risk groups. COVID-19 (coronavirus disease 2019) is the infectious disease caused by the new coronavirus (2019-nCoV), which at first was temporarily named 2019-nCoV and subsequently received the name SARS-CoV-2 [1-5].

Regarding human infection with the new coronavirus, the clinical spectrum is not fully described and the pattern of lethality, mortality, infectivity and transmissibility is unknown. The clinical signs can vary from mild to moderate, similar to the flu or, in some cases, it can be more severe, with severe acute respiratory syndrome. There is still no vaccine or specific drugs available and, currently, treatment is supportive and nonspecific [1-3]. However, it is known that possible complications can determine immediate hospitalization of the patient and about 5% need intensive care [1,3,5]. Patients who require intensive care units (ICUs) remain in these units for a long period, which, in itself, is a cause for the development of malnutrition, with loss of function and skeletal muscle mass, increasing the morbidity and mortality of these patients [6].

Thus, patients who need prolonged hospitalization due to other comorbidities and due to the severity of the disease, must be extra careful in assessing malnutrition and loss of muscle mass [6]. The emerging literature on patients with COVID-19 highlights the importance of nutrition in achieving positive results. Evidence shows that advanced age and the presence of comorbidities are almost always associated with impaired nutritional status and sarcopenia, regardless of the Body Mass Index (BMI) [7]. The prevention, diagnosis and treatment of malnutrition should therefore be routinely included in the treatment of patients with COVID-19.

Nutritional support is one of the essential components of health care for all inpatients diagnosed with COVID-19. The oral route will always be preferable when practicable (less severe patients), including the use of oral nutritional supplements (ONS) [8,9]. Pa-

tients at nutritional risk should receive nutritional support as early as possible, particularly by increasing protein intake by supplements [8,10]. Jin., *et al.* [10]. also emphasize that even patients with COVID-19 who are not at risk of malnutrition should maintain adequate protein (1.5/d) and calories (25-30 kcal/d) intake, including the use of oral nutritional supplements, when the estimated energy and protein intake is less than 60% of the needs [8,10]. Moreover several vitamins and nutrients may have the potential to benefit infected patients due to their anti-inflammatory and antioxidants properties [11].

Regarding the nutritional recommendations of less severe patients, ESPEN⁹ recommends: 27 kcal per kg of body weight and day; total energy expenditure for polymorbid patients aged >65 years; 30 kcal per kg of body weight and day; total energy expenditure for polymorbid patients with low weight; 30 kcal per kg of body weight and day; guiding value of energy intake in older persons, this value must be individually adjusted in relation to nutritional status, physical activity level, disease status and tolerance. Protein needs are usually estimated using formulae such as: 1 g protein per kg body weight and day in older persons; the amount should be individually adjusted with regard to nutritional status, physical activity level, disease status and tolerance; ≥ 1 g protein per kg body weight and day in polymorbid medical inpatients in order to prevent body weight loss, reduce the risk of complications and hospital readmission and improve functional outcome.

The nutritional management of a patient with COVID-19 in the ICU is, in principle, very similar to any other ICU patient admitted with pulmonary compromise. Given the lack of direct evidence in patients with COVID-19, especially those who are shocked, many of these recommendations are based on indirect evidence from sick patients in general and with sepsis and ARDS.⁶ Therefore, the administration of nutritional therapy to critical patients with COVID-19 disease must follow the basic instructions for nutrition in intensive care of the current recommendations [6,9,12,13].

Nutritional therapy is essential during the treatment of hospitalized patients with COVID-19, and should be started as early as possible (24-36 hours after admission to the ICU or 12 hours af-

ter intubation⁶ or between 24 and 48 hours [9,14]. Critically ill patients with COVID-19 disease have been reported to be older with multiple comorbidities. Such patients are often at-risk of refeeding syndrome [6,15].

According to ASPEN [6], the caloric goal of the Enteral Nutrition must be reached slowly during the first week of critical illness, to reach the energy target of 15-20 kcal/kg actual body weight (ABW)/day (which should be 70 to 80% of caloric requirements) and proteins of 1.2-2.0 g/kg ABW/day. ESPEN [9] recommends that hypocaloric nutrition (not exceeding 70% EE) should be administered in the initial phase of acute illness in increments of up to 80 and 100% after DAY 3. If predictive equations are used to estimate energy requirements, hypocaloric nutrition (below 70% of the estimated needs) should be preferred to isocaloric nutrition in the first week of admission to the ICU due to reports of overestimation of energy needs. As for protein, during severe illness, 1.3g/kg of protein equivalent per day can be delivered progressively. This target has been shown to improve survival mainly in fragile patients. For people with obesity, in the absence of body composition measures 1.3g/kg of protein equivalent "adjusted body weight" per day is recommended. The adjusted body weight is calculated as the ideal body weight ρ (real body weight - ideal body weight) * 0.33.

The Brazilian Society of Parenteral and Enteral Nutrition (BRASPEN) [14]. suggests starting with a lower caloric intake, between 15 to 20 kcal/kg/day and progressing to 25 kcal/Kg/day after the fourth day of recovering patients. It is suggested that these patients receive between 1.5 and 2.0g/kg/day of protein, even in case of renal dysfunction, with the following suggestion of progression: <0.8g/kg/day on the 1st and 2nd days, 0.8-1.2g/kg/day on days 3-5 and > 1.2 g/kg/day after the 5th day.

The National Health Commission of the People's Republic of China and the National Administration of Traditional Chinese Medicine recommend implementing "strengthened supportive care to ensure sufficient energy intake" [7,16].

Considering the importance of preserving skeletal muscle mass and function and the highly catabolic conditions related to disease and hospital stay, additional strategies can be considered in Nutritional Therapy to improve skeletal muscle anabolism, maintenance and recovery of nutritional and immune status, in addition to better prognosis for patients hospitalized with COVID-19.