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Assessment of Nutritional Risks in COVID-19 Patients

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Since the announcement of the COVID-19 pandemic by the world health organization, various issues concerning COVID-19 patients have been analyzed. However, some simple issues like exercise (1) and nutrition support in COVID-19 patients are yet to be discussed. It has been revealed that malnutrition is associated with the poor prognosis of critically ill patients (2). According to the early evidence from China (3), the prevalence of malnutrition in COVID-19 patients was 52.7%, accounting for more than half of the patients. Also, the high prevalence of malnutrition among COVID-19 patients supports the idea that malnutrition is a frequent problem among them and can be considered a prognostic factor (4,5).

European Society for Clinical Nutrition and Metabolism (ESPEN) (6) has recently issued a series of recommendations on how to treat malnutrition in COVID-19 patients admitted to Intensive Care Unit (ICU), as malnutrition is yet a major risk factor (7) when it comes to the viral pandemic. First of all, the patients should be screened on a routine basis for malnutrition. Several tools are available for this purpose, such as Malnutrition Universal Screening Tool (MUST) or Nutrition Risk Screening 2002 (NRS-2002) or NUTRIC score. However, the scores themselves are not going to help the physician handle the malnutrition. Therefore, a dietician or an expert is needed, someone who can calculate a patient's caloric requirements and prescribe a well-balanced and personalized diet for each patient, considering their conditions. The patient's diet must include an adequate amount of carbohydrates, proteins, and fat, as well as enough micronutrients, such as vitamins and minerals. When nutritional supplements are required, the priority is to start with oral nutritional supplements, rather than enteral. Enteral and then parenteral nutrition should be applied when oral supplements are somehow not enough or when the previous step fails to provide the desired nutritional profile for the patient. Special recommendations on nutritional support for COVID-19 patients admitted to ICU include screening for malnutrition, defining the dietary needs, and choosing the

proper approach for feeding the patient (oral, enteral, or parenteral) based on their condition, which mainly depends on whether the patient is intubated or not.

It has been suggested that NRS 2002, Mini Nutrition Assessment Shortcut (MNA-sf), and Nutrition Risk Index (NRI) are appropriate criteria for screening the COVID-19 patients (severe or non-severe cases) who are at risk of malnutrition (8). These scores allow us to monitor patients closely and start nutritional interventions as soon as necessary. Also, it was reported that higher NRS (More than 5 scores) is associated with more length of hospital stay (9). The fact that critically ill COVID-19 patients are more likely to be at nutritional risk has proven that the higher the nutritional risk, the worse the outcome would be (10). It should be taken into account that the most important point that is overlooked is assessing the biochemical indices and micronutrients status in COVID-19 patients. Accordingly, it seems that nutritional screening for hospitalized COVID-19 patients is highly recommended, especially in severe cases of critically ill patients.

COVID-19 obese patients are complicated cases for implementation of nutritional practice, because obesity leads to insulin resistance, which is correlated with SARS-CoV-2–induced decrease in angiotensin-converting enzyme-2 (11). As a result, pancreatic β-cell reserve decreases and therefore, counter-regulatory renin-angiotensin system affects cardioprotection, resulting in hyperglycemia, cardiovascular events, and thus a poor prognosis. So altogether, obesity should be considered a major risk factor for COVID-19 patients that would put the patient at a high risk of malnutrition, rapid organ failure, and a poor outcome.

It was suggested that nutritional assessment should be considered for all COVID-19 patients (12), particularly in vulnerable populations, like patients with comorbidities, obesity, and socioeconomic factors which may increase the risk of malnutrition and refeeding syndrome (13). It should be kept in mind that hospitalized patients (particularly in ICU) are at risk of sarcopenia and malnutrition because they are under mechanical ventilation or complete bed rest. For nutritional support, the role of exogenous protein on muscle anabolism in COVID-19 is still unknown (14). Previous studies confirmed the beneficial role of early Enteral Nutrition (EN) and some supplementary substances (like ω-3 fatty acids, micronutrient supplementation) in non-COVID-19 patients (15), which almost influenced the maintenance of gut epithelial barrier and improved the immune responses. Unfortunately, there is not enough evidence to support such facts in COVID-19 patients.

In conclusion, a set of proposed recommendations are provided for a better outcome in intensive care management of COVID-19 patients. It is always necessary to evaluate the patient's nutritional profile as well as other routine laboratory tests, and when not available, the patient's situation in terms of malnutrition should be assessed as COVID-19 patients are at higher risk of malnutrition. Redefining or revising the nutrition scores and guidelines for COVID-19 patients seems helpful since the patients are already underfed on admission to the hospital. For those patients under Noninvasive Ventilation (NIV), considering appropriate interfaces, such as NIV helmets would facilitate oral feeding and therefore, would result in a better outcome (NIV helmets have special valves for oral nutrition that enable patients for oral feeding). Measuring and comparing calories and nutritional intake for patients receiving NIV and intubation would also help lighten the path through a new nutritional approach in COVD-19 patients. Lastly, less likely conditions such as bowel obstruction and intestinal thrombosis, which could result in enteral nutrition intolerance, should be regarded more seriously and not be overlooked.

However, several questions remain unanswered:1) what are the benefits and drawbacks of early parenteral nutrition in hospitalized patients?, 2) when should the enteral nutrition be started (particularly in ICU)?, 3) is it possible to compare enteral and parenteral nutrition in terms of mortality and recovery?, and 4) which supplements may have survival benefits for hospitalized patients (particularly in ICU)?. Therefore, researchers and nutritionists are recommended to look for the answer to these questions as they will be a great help in managing COVID-19 patients.

Keywords: Cardiovascular disease, Critical care, Malnutrition, Nutrition assessment, Respiratory failure, SARS CoV-2

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