REVIEW SUMMARY

Lessons Learned in Nutrition Therapy in Patients with Severe COVID-19

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Background:

First detected in Wuhan, China, coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS -CoV-2). Severely contagious, the incubation period for this disease is approximately 2 weeks. There is a widespread range of symptoms, with some being asymptomatic and others progressing to respiratory failure and critical illness. Risk factors for progression to severe disease include metabolic and nutrition issues such as obesity, hyperlipidemia, diabetes and frailty. It is suggested that severe COVID 19 falls into 3 nutrition phenotypes: frail older adult; ongoing chronic illness; and severe, morbid obesity, which demand differential approaches towards optimal medical nutrition therapy (MNT).

- **Frail Older Adult:**
  Malnutrition and sarcopenia, as well as comorbidities that increase mortality risk in COVID 19 patients, such as hypertension, obesity, cardiovascular disease and diabetes are prevalent in older age. Nutritional assessment should focus on eating habits, nonvolitional weight loss and assessment of muscle mass.
- **Chronic Debilitating Illness:**
  Cirrhosis, end-stage renal disease, active cancers, pulmonary diseases, cardiovascular disease and diabetes are risks for development of severe COVID-19. Malnutrition is prevalent in these populations.
- **Severe and Morbid Obesity:**
  Independent of age, obesity imposes an increased independent risk factor for disease severity and ICU admission among COVID-19 patients. Potential explanations include an increased inflammatory response, myocardial fibrosis, dysfunction of macrophages and lymphocytes and increased susceptibility to severe infection. Possible hypotheses behind increased severity of COVID-19 in obesity include nutritional deficiencies of Vitamin D, omega-3 fatty acids, zinc, selenium; altered metabolic effects associated with diabetes mellitus, hyperlipidemia, pulmonary disorders, cardiovascular disease, renal dysfunction, hypercoagulable states and protein malnutrition.
- **Nutrition Intervention:**
  Intervention should include a nutrition assessment tool such as subjective global assessment, history of weight loss and assessment of muscle mass. Key laboratory tests suggested include complete white blood cell count, coagulation studies (platelet count), D dimer, and C-reactive protein + serum albumin to determine inflammation. Vitamin D, Vitamin B and iron assessment should also be completed to rule out deficiencies. Macronutrient assessment should be consistent with suggested critical care recommendations and include protein requirements of 1.3 – 2.0 g/kg/day, respecting renal and hepatic functions. Due to ventilatory support, risk of aspiration and taste changes, oral intake may be inadequate or impossible. Early enteral nutrition should be considered, as appropriate, and following attainment of hemodynamic stability. Early parenteral nutrition aimed at avoiding development of an energy deficit is of little value but may be needed in the patient with underlying severe protein and energy malnutrition who cannot receive adequate enteral nutrition.
- **Achieving Nutrition Goals First Week and Beyond:**
  Enteral nutrition is the first line of nutrition therapy for patients with severe COVID-19 in the ICU. Begin with trickle feeds and advance to goal over the first week of ICU stay. In the first few ICU days, enteral protein delivery goal is 1.3 g pro/kg actual body weight for non-obese patients and 1.3 g pro/kg ideal body weight for overweight patients. Calorie requirements range from 25 kcal/kg actual body weight/day for non-obese patients and < 20kcal/kg IBW or <70% of calculated needs for the overweight patient. Beyond the first week in the ICU, liberalizing energy needs to 100% of calculated or measured goals may be indicated. Caution should be taken not to overfeed calories to the patient with limited mobility and lower energy expenditure, including the patient with severe or morbid obesity and diabetes, who may benefit from higher protein and lower energy intake. Little is known regarding the ideal way to provide MNT long-term following critical illness. Application of resistance training with adequate protein and calories may be beneficial.

Article may be accessed at:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7461365

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