Mediterranean Journal of Nutrition and Metabolism 13 (2020) 113–117
DOI:10.3233/MNM-200425
IOS Press

Position Paper

Position paper of the Italian association of medical specialists in dietetics and clinical nutrition (ANSISA) on nutritional management of patients with COVID-19 disease

Hellas Cena[a,b], Silvia Maffoni[a,*], Valentina Braschi[b,c], Silvia Brazzo[b], Cristina Pallavicini[b], Ilaria Vietti[b], Sandra Portale[d] and Ettore Corradi[d]

[a]*Laboratory of Dietetics and Clinical Nutrition, Department of Public Health, Experimental and Forensic Medicine, University of Pavia, Pavia, Italy*
[b]*Clinical Nutrition and Dietetics Service, Unit of Internal Medicine and Endocrinology, ICS Maugeri IRCCS, Pavia, Italy*
[c]*Residency Student at the Post-graduate School of Specialization in Dietetics and Clinical Nutrition, State University of Milan, Milan, Italy*
[d]*Complex Structure of Dietetics and Clinical Nutrition, ASST GOM Niguarda, Milano, Italy*

Received 11 April 2020
Accepted 13 April 2020

Abstract. COVID-19 disease is characterized by serious clinical manifestations which could require urgent hospitalization. Prolonged hospitalization, with catabolism and immobilization, induces a decrease in weight and muscle mass which can result in sarcopenia, a condition that impairs respiratory and cardiac function, worsening the prognosis. In this scenario there is an urgent need of nutritional indications aimed to prevent or contrast hospital malnutrition by improving the patient's response to therapy and to facilitate healthcare professionals in managing nutritional interventions on patients, reducing their already high workload due to the state of emergency.

Keywords: Nutritional management, nutrition therapy, COVID-19 disease, SARS-CoV-2, malnutrition, COVID-19 hospitalization, artificial nutrition, dietary and nutritional indications

COVID-19 disease, caused by SARS-CoV-2 virus infection, is characterized by serious clinical manifestations such as pneumonia with respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, which require urgent hospitalization, in the most severe cases in intensive care units (ICU) [1]. ARDS

*Corresponding author: Silvia Maffoni, Laboratory of Dietetics and Clinical Nutrition, Department of Public Health, Experimental and Forensic Medicine, University of Pavia, via Bassi 21, 27100 Pavia, Italy. Tel.: +39 0382987881; Fax: +39 0382987191; E-mail: silviairenemaffoni@yahoo.it.

ISSN 1973-798X/20/$35.00

Table 1
Dietary and nutritional indications in hospitalized patient with COVID-19 disease [8, 9]

1 – Assessment of malnutrition
- ***MIld:*** 5–10% of weight loss on usual body weight
- ***Moderate:*** 11–20% of weight loss on usual body weight
- ***Severe:*** >20% of weight loss on usual body weight

2 - Estimate of requirements
- **Energy:** in relation to the measured or calculated basal metabolic rate (25–30 kcal/kg/die)
- **Proteins:** 1.5 g/kg/die
- **Lipids:** 30–35% of total energy intake
- **Carbohydrates:** 50% of total energy intake, favoring sources with low glycemic index.

3 - Example of a balanced daily dietary scheme for patients
- ***Breakfast:*** milk or yoghurt + rusks or bread or cereals
- ***Lunch and dinner***: cereals (rice or pasta) + protein-rich foods (meat, fish, legumes, eggs, soy, cheese) + bread + vegetables + fruit
- ***Snacks:*** yoghurt or pudding or single portion of cheese + crackers

N.B. *Raw foods and cold cuts will be excluded from the Hospital menu.*

4 - Supplementation with essential amino acids

To be considered in case of malnourished, sarcopenic patient or during rehabilitation (e.g. 8 g of essential amino acids per os)

5 - Supplementation with multivitamins

To be considered in case of inadequate dietary intake or known inadequacy/deficiency

6 - Supplementation with probiotics

To be considered in case of antibiotic therapy or gastrointestinal discomfort

7 - Supplementation with vitamin D

To be considered in case of deficiency (<12.5 ng/ml o 50 nmol/l): vitamin D3 400.000–600.000 UI to be administered over 8 weeks, followed by maintenance dose (1.000–4.000 UI/die)

8 – Water requirement

Maintain adequate fluid intake to ensure a good state of hydration, according to pathological history of the patient (heart or kidney failure, diarrhea, vomiting, electrolyte imbalances).

9 – Complete nutritional supplement per os

To be considered in case of inadequate energy-protein intake with food due to loss of appetite or to breathing room air with lower oxygen saturation during the meal: high protein- energy nutritional supplement preferably in small volume size (e.g. 125 ml), 3–6 times/day based to needs.

At meals we recommend the use of disposable tableware (plates, glasses, cutlery...).

It is recommended to refer to the National Reference Intake Levels or Recommended Dietary intakes for Nutrients.

in particular is characterized by severe hypoxic respiratory failure with inflammation, pulmonary edema and risk of multi-organ dysfunction and often requires invasive mechanical ventilation due to poor lung compliance [2]. First analysis of the data by the Italian national Health Institute (ISS) on deaths from SARS-CoV-2 showed an average age of 78 years and the presence of 3 or more comorbidities including chronic non-communicable diseases (NCDs) such as ischemic heart disease, hypertension, diabetes and chronic obstructive pulmonary disease (COPD) [3]. Old age and comorbidities are related to *frailty*, a syndrome characterized by the reduction in functional reserves and decreased resistance to stressful events [4], which affects 12% of the Italian population aged 65–74 years old and 29% of those over 85 [5]. Frailty is related to weight loss and malnutrition and an acute hospitalization without adequate nutritional support can worsen an already compromised situation. However,

Table 2
Management of artificial nutrition in critically ill patients with COVID-19 [10]

Enteral Nutrition (EN)

1 – Choice of the enteral formula (EF), based on hospital pharmacy availability:

a. High-protein energy EF, low carbohydrates, omega-3 enriched, no fiber
b. High-protein energy EF, low carbohydrates, no fiber
c. High-protein energy EF, no fiber
d. High-protein energy EF, with soluble fiber

2 – Body weight measurement (measured at admission or reported)

3 – Requirements

A. Energy requirement: 20–25 kcal/kg/die
Start with no more than 70% of the daily requirements and increase progressively (do not exceed 100%)
B. Protein requirement: 1.2–2 g/kg/die

4 – Continuous infusion speed (24 h)

Start with the minimum speed and gradually increase
– Days 1–2: 20–40 ml/h
– Day 3: 30–50 ml/h
– Days 4-5: 40–60 ml/h
– From day 6: maximum tolerated speed, add mixture with fibers

N.B. In case of intolerance do not stop abruptly but slow down the speed and investigate the potential causes.

5 – Vitamin D supplementation

– In case of deficiency (<12.5 ng/ml or 50 nmol/l): vitamin D3 500.000 UI in one single administration within the first week of admission

6 – Supplementation with amino acids

– If protein intake does not satisfy daily requirements or in debilitated patients, amino acid supplementation (e.g. 8 g of essential amino acids per os) is recommended.

Examples

Body weight 50 kg
Energy requirement: 1000–1250 kcal/die
Days 1–2: 20 ml/h (≈700 kcal/die)
Day 3: 30 ml/h (≈1000 kcal/die)
From day 4: 50 ml/h (≈1250 kcal/die)

Body weight 70 kg
Energy requirement: 1400–1750 kcal/die
Days 1–2: 30 ml/h (≈1000 kcal/die)
Day 3: 40 ml/h (≈1400 kcal/die)
From day 4: 45 ml/h (≈1600 kcal/die)

Body weight 100 kg
Energy requirement: 2000–2500 kcal/die
Days 1–2: 40 ml/die (≈1400 kcal/die)
Day 3: 50 ml/die (≈1800 kcal/die)
From day 4: 60 ml/h (≈2200 kcal/die)

Table 2
(*continued*)

Supplementary or Total Parenteral Nutrition (PN)
If EN does not cover the requirements it is possible to introduce a supplementary PN. If total EN is contraindicated, PN is recommended within 3–7 days.
The route selected for delivery of nutrition must be determined by the patient's medical condition and the PN estimated duration (Central if >15 days, Peripheric if <15 days or as supplement).
Calculation of nutrients requirements does not differ from what already reported above for EN.
It is strongly recommended not to exceed glucose and lipid thresholds respectively 5 mg / kg / min and 1.5 g / kg / day, as well as the infusion rates of the selected formula.

among the deceased there are also people affected by obesity [3], a condition associated with low-grade chronic inflammation, NCDs and sarcopenia. Given the high prevalence in the Italian adult population [6], it cannot be excluded that obesity and overweight are frequent among hospitalized patients.

It is necessary to remember that all the patients hospitalized for more than 48 hours are at risk of malnutrition and need prompt and appropriate nutritional intervention, regardless of initial *body mass index* (BMI) and age. Prolonged hospitalization, with catabolism and immobilization, induces a decrease in weight and muscle mass which can result in *sarcopenia*, a condition that impairs respiratory and cardiac function, prolonging patient's hospitalization and worsening the prognosis [7].

The following nutritional indications aim to prevent or contrast hospital malnutrition by improving the patient's response to therapy and to facilitate healthcare professionals in managing nutritional interventions on patients, reducing their already high workload due to the state of emergency.

We propose different reccomandations according to the patient's degree of autonomy and requirements whether delivered by oral (Table 1) or artificial means (Table 2).

Funding acknowledgment

The authors received no financial support for the research, authorship, and/or publication of this article.

Conflict of interest

The authors have no conflict of interest to report.

References

[1] Cascella M, Rajnik M, Cuomo A, et al. Features, Evaluation and Treatment Coronavirus (COVID-19) [Updated 2020 Mar 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan.

[2] Dushianthan A, Grocott MP, Postle AD, Cusack R. Acute respiratory distress syndrome and acute lung injury. Postgraduate Medical Journal. 2011;87(1031):612-22.

[3] Istituto Superiore di Sanità. Caratteristiche dei pazienti deceduti positivi a COVID-19 in Italia Dati al 26 marzo 2020.

[4] Rohrmann S. Epidemiology of Frailty in Older People. Adv Exp Med Biol. 2020;1216:21-27.

[5] https://www.epicentro.iss.it/passi-argento/.

[6] https://www.epicentro.iss.it/obesita/epidemiologia-italia.

[7] P. Singer et al. ESPEN guideline on clinical nutrition in the intensive care unit. Clin Nutr. 2019;38(1):48-79.

[8] Linee guida SINPE per la Nutrizione Artificiale Ospedaliera 2002 - Parte Speciale B. Nutrizione Artificiale nella insufficienza respiratoria.

[9] Jin YH, Cai L, Cheng ZS, et al. A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). Mil Med Res. 2020;7(1):4. Published 2020 Feb 6. doi:10.1186/s40779-020-0233-6

[10] Singer P, et al. ESPEN guideline on clinical nutrition in the intensive care unit. Clin Nutr. 2019;38(1):48-79. doi: 10.1016/j.clnu.2018.08.037. Epub 2018 Sep 29.