



RD Board Advisory

GENERAL GUIDELINES FOR MEDICAL NUTRITION THERAPY TO BE FOLLOWED FOR COVID 19.

COVID 19 presents as a multistage syndrome. The classification, characteristics (*sourced from Clinical management of severe acute respiratory infection when Novel coronavirus (2019-nCoV) infection is suspected: Interim Guidance – Feb 2020 – WHO*) and the suggested nutritional protocol has been outlined herewith:

Stages and characteristics of COVID 19:

1. Uncomplicated illness:

- Patients with uncomplicated upper respiratory tract viral infection, may have non-specific symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache, muscle pain or malaise.
- The elderly and immunosuppressed may present with atypical symptoms.
- These patients do not have any signs of dehydration, sepsis or shortness of breath.

2. Mild Pneumonia:

- Patient with pneumonia and no signs of severe pneumonia.
- Child with non-severe pneumonia has cough or difficulty breathing + fast breathing: fast breathing (in breaths/min): <2 months, ≥ 60 ; 2–11 months, ≥ 50 ; 1–5 years, ≥ 40 and no signs of severe pneumonia.

3. Severe Pneumonia:

- Adolescent or adult: fever or suspected respiratory infection, plus one of respiratory rate >30 breaths/min, severe respiratory distress, or SpO₂ $<90\%$ on room air (adapted from [1]).
- Child with cough or difficulty in breathing, plus at least one of the following: central cyanosis or SpO₂ $<90\%$; severe respiratory distress (e.g. grunting, very severe chest indrawing); signs of pneumonia with a general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions. Other signs of pneumonia may be present: chest indrawing, fast breathing (in breaths/min): <2 months, ≥ 60 ; 2–11 months, ≥ 50 ; 1–5 years, ≥ 40 .² The diagnosis is clinical; chest imaging can exclude complications.

4. Acute Respiratory Distress Syndrome:

- Onset: new or worsening respiratory symptoms within one week of known clinical insult.
- Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse, or nodules.



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- Origin of oedema: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of oedema if no risk factor present.
 - Oxygenation (adults):
 - ❖ Mild ARDS: $200 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg}$ (with PEEP or CPAP $\geq 5 \text{ cmH}_2\text{O}$, 7 or non-ventilated)
 - ❖ Moderate ARDS: $100 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 200 \text{ mmHg}$ with PEEP $\geq 5 \text{ cmH}_2\text{O}$, 7 or non-ventilated)
 - ❖ Severe ARDS: $\text{PaO}_2/\text{FiO}_2 \leq 100 \text{ mmHg}$ with PEEP $\geq 5 \text{ cmH}_2\text{O}$, 7 or non-ventilated)
 - ❖ When PaO_2 is not available, $\text{SpO}_2/\text{FiO}_2 \leq 315$ suggests ARDS (including in non-ventilated patients)
 - Oxygenation (children; note OI = Oxygenation Index and OSI = Oxygenation Index using SpO_2):
 - ❖ Bilevel NIV or CPAP $\geq 5 \text{ cmH}_2\text{O}$ via full face mask: $\text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg}$ or $\text{SpO}_2/\text{FiO}_2 \leq 264$
 - ❖ Mild ARDS (invasively ventilated): $4 \leq \text{OI} < 8$ or $5 \leq \text{OSI} < 7.5$
 - ❖ Moderate ARDS (invasively ventilated): $8 \leq \text{OI} < 16$ or $7.5 \leq \text{OSI} < 12.3$
 - ❖ Severe ARDS (invasively ventilated): $\text{OI} \geq 16$ or $\text{OSI} \geq 12.3$
5. Sepsis:
- Adults: life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection, with organ dysfunction.
 - ❖ Signs of organ dysfunction include: altered mental status, difficult or fast breathing, low oxygen saturation, reduced urine output, fast heart rate, weak pulse, cold extremities or low blood pressure, skin mottling, or laboratory evidence of coagulopathy, thrombocytopenia, acidosis, high lactate or hyperbilirubinemia.
 - Children: suspected or proven infection and ≥ 2 SIRS criteria, of which one must be abnormal temperature or white blood cell count.
6. Septic Shock
- Adults: persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP $\geq 65 \text{ mmHg}$ and serum lactate level $> 2 \text{ mmol/L}$.
 - Children (based on [12]): any hypotension (SBP $< 5^{\text{th}}$ centile or > 2 SD below normal for age) or 2-3 of the following: altered mental state; tachycardia or bradycardia (HR $< 90 \text{ bpm}$ or $> 160 \text{ bpm}$ in infants and HR $< 70 \text{ bpm}$ or $> 150 \text{ bpm}$ in children); prolonged capillary refill ($> 2 \text{ sec}$) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.



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Nutritional Guidelines: The broad nutritional principles have been suggested from the following documents all of which have been attached as Appendices for further reference:

Appendix 3 B. Clinical management of severe acute respiratory infection when Novel coronavirus (2019-nCoV) infection is suspected: Interim Guidance – Feb 2020 – WHO

Appendix 3 C. Barazzoni R, Bischoff SC, Krznaric Z, Pirlich M, Singer P, endorsed by the ESPEN Council, Espen expert statements and practical guidance for nutritional management of individuals with sars-cov-2 infection, Clinical Nutrition, <https://doi.org/10.1016/j.clnu.2020.03.022>.

Appendix 3 D. Martindale R. et al. (2020). Nutrition Therapy in the Patient with COVID-19 Disease Requiring ICU Care. Reviewed and Approved by the Society of Critical Care Medicine and the American Society for Parenteral and Enteral Nutrition.

Appendix 3 E. Jiyaying Z. et al. (2020). Expert recommendations for Nutritional Therapy for COVID 19 Pneumonia

Appendix 3 F. (provided only as a link) Editor-in-Chief, Prof & Yu, Ligen. (2020). Handbook of COVID-19 Prevention and Treatment. https://www.researchgate.net/publication/339998871_Handbook_of_COVID-19_Prevention_and_Treatment

Appendix 3 G. Singer, Pierre et al. (2019). ESPEN guideline on clinical nutrition in the intensive care unit. Clinical Nutrition, Volume 38, Issue 1, 48 - 79

Uncomplicated Illness:

- Ensure that the patient eats well with adequate nutrition both macro and micro nutrients. Ensure caloric and protein adequacy
- Nutrients can be provided in liquid and soft form due to expected loss of appetite and fever
- Ensure adequacy of fluids
- Proactively assess for Vitamin D status and take measures to correct a deficiency if observed.
- If the disease progresses in severity, intestinal dysfunction can be expected. Pro and prebiotics as food and if required supplements can be suggested
- Immune boosting nutrients – Vitamin A, Vitamin C, Vitamin E, B Complex adequacy, Zinc, Selenium, Iron and Copper needs too be adequate in the dietary protocol.
- Anti inflammatory measures can be initiated in the diet – Use of Omega 3 fatty acids(through food and supplement), turmeric and lime – in food and in infusions, garlic incorporation in recipes, plenty of flavonoids through green teas, soups and vegetable purees and fruits can be used



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- Natural anti virals can be started – teas with cloves, neem, tulsi can be started. Honey can be used to clear chest congestion. Eucalyptus steam inhalation is beneficial.
- Warm gargles and nasal irrigation may give relief.
- It is crucial to take utmost care in the elderly and those with co morbidities. Medical nutrition protocol for Blood glucose and blood pressure control and monitoring needs to be robustly initiated.

Mild Pneumonia:

- Ensure the patient is eating adequately to meet the calories and protein requirement as well as the micronutrient needs.
- Consider using a nutritional supplement (high calorie and high protein) without added sugars in such a patient specially if pediatric to meet the nutritional requirements if the patient is not consuming adequate amounts
- Continue working with the guidelines for uncomplicated illness in case of mild pneumonia too.

Severe Pneumonia and Acute Respiratory Distress Syndrome:

- Parenteral Nutrition Support is initiated in hospitalised patients.
- Oral feeding(in severe pneumonia) can be continued – with support of commercial oral nutritional formulae without added sugars but proactive enteral feeding can be initiated if patient is not having adequate amounts.
- ARDS patients need to be started on enteral feeding proactively.
- Post pyloric feeding to be initiated in patients with GERD, and risk of aspiration and severe cough.
- Early enteral nutrition i.e. in the first 48 hours of admission in ICU is beneficial. The caloric density needs to be started slowly and progressively.
- Initial caloric infusion can be between 15- 20 Kcals / kg body weight upto two days and increasing to 20 -25 and then 25 -30 Kcals/Kg body weight.
- Alternatively, caloric equations as stated in Appendix 3 C. can be used to determine energy requirements.
- Pulmonary nutrition care protocols to be initiated with regards both parenteral and enteral feedings with the carbohydrate to fat ratio being 50:50 or lesser carbohydrate.
- Lipid infusions need to be slowly administered if parenteral and fat in enteral feeds need to be evenly distributed
- Use of MCT oils in enteral feed may offset some catabolism and may help in gastrointestinal issues if it develops.
- Use of omega 3 as EPA and DHA is of benefit to reduce inflammation
- Protein needs start to rise with the catabolism and provision of 1.3 gms/kg body weight and upwards based on requirements need to be considered.
- GI issues may occur like diarrhoea and concurrent malnutrition may occur – with Inflammatory bowel disease observed in a few cases. Enteral feeds to be continued unless



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ileus is observed. Active diarrhoea management with soluble fibre and pre and probiotics need to be looked at.

- Provision of anti inflammatory nutrients and immune boosting nutrients can be continued as the case allows.
- Continuous nutritional assessment needs to be done to assess catabolism; appearance of metabolic issues like dyslipidemia, hyperglycaemia, hypophosphatemia and anaemia; co morbidities control; fluid and electrolyte balance needs to be looked at.

Sepsis and Septic Shock

The above mentioned protocols are to be continued. Nutritional care for pulmonary distress needs to be emphasised on. In addition, Medical Nutrition Therapy for Multi Organ Dysfunction Syndrome needs to be initiated.

Acute Kidney Injury with Continuous Hemofiltration:

- Protein needs are raised to 1.3 – 2 gms /kg body weight.
- Renal replacement Therapy will lead to micronutrient losses and these need to be replaced.
- Vitamin C needs to be cautiously given due to chances of being converted to oxalate. No more than 200 mgs to be given/day.
- Hyponatremia and hyperkalemia and fluid restriction needs to be taken care of.

Gastrointestinal dysfunction:

- Severe diarrhoea and impending liver failure may be seen.
- In case of edematous bowel, enteral feedings may be curtailed or withdrawn.
- Diarrhoea management is crucial if enteral feeds are on. Use of soluble fiber can be continued. Probiotics is not suggested at this critical juncture
- Use of MCT may help handle the steatorrhea.



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