

Medical Nutrition Therapy for COVID-19- Quick Guide

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*The delivery of nutritional therapy to the patient with COVID-19 disease should follow the basic principles of critical care nutrition. Specific to these patients, is the need to promote strategies which help cluster care, reduce the frequency with which healthcare providers interact with patients, minimize contamination of additional equipment, and avoid transport out of the ICU.¹

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Nutrition Screening

Patients who are older adults and polymorbid individuals should be checked for malnutrition through screening. (Example: MUST, NRS-2002, GLIM). Obesity may mask malnutrition; therefore, obese patients should be screened according to ability to preserve healthy body weight and skeletal muscle mass.²

At ICU 'high nutrition risk' are defined as those with:

- Anaphylactic food allergy
- Pre-existing or suspected malnutrition (e.g. weight <50kg, BMI <18.5 kg/m², recent weight loss of ≥5%)
- Weight >120kg or Body Mass Index (BMI) >40
- Requiring parenteral nutrition (PN)
- Considered at high risk of refeeding
- Type 1 diabetes mellitus
- Cystic fibrosis
- Inborn errors of metabolism

All other patients are considered 'low nutrition risk'.³

At acute ward 'high nutrition risk' are defined as those:

- Requiring EN or PN
- Malnutrition or suspected malnutrition (Malnutrition Screening Tool (MST) ≥3, Malnutrition Universal Screening Tool (MUST) ≥2, BMI <18.5 kg/m², recent weight loss ≥ 10%)
- Anaphylactic food allergy
- Considered at high risk of refeeding
- Type 1 diabetes mellitus
- Cystic fibrosis
- Inborn errors of metabolism³

Nutrition Assessment

Nutrition Associated Problem With COVID-19 Or COVID-19 Treatment:

- Nausea, vomiting, diarrhea, abdominal pain and severe fatigue which impair food intake and absorption.
- Side effects of Antiviral drugs (such as Chloroquine): Gastrointestinal disorders.⁴

For Prevention and treatment of malnutrition in individuals at risk or infected with COVID-19:

Energy needs:

- For polymorbid patients aged >65 years: **27 kcal/kgBW/day**
- For severely underweight polymorbid patients: **30 kcal/kgBW/day***
- **30 kcal/kgBW/day**; guiding value for energy intake in older persons^{‡2}

Protein needs:

- **1 g/kgBW/day** in older persons[‡]
- **> 1 g/kgBW/day** in polymorbid medical inpatients in order to prevent body weight loss, reduce the risk of complications and hospital readmission and improve functional outcome.²

*Should be cautiously and slowly achieved, as this is a population at high risk of refeeding syndrome

‡This value should be individually adjusted with regard to nutritional status, physical activity level, disease status and tolerance.

Critical ill patient- infected with COVID-19:

Energy needs:

15-20 kcal/kg actual body weight (ABW)/day (which should be 70-80% of caloric requirements) *.¹

* Recommend after day 5 provide 25 kcal/kg bodyweight/day (and up to 30 kcal/kg bodyweight/day for severely unwell patients). ABW should be used for patients of normal weight, and an adjusted BW for overweight and obese patients.

Consider the metabolic impact of increased temperature in the overall nutrition prescription.³

Protein needs:

1.2-2.0 gm/kg ABW/day¹ - "For obese patient: 1.3 g/kg adjusted BW"²

Nutrition Route	<p>Oral diet:</p> <ul style="list-style-type: none"> • Energy and protein enriched diet. Except for diabetic patient provide protein enriched diet in consultation with dietitian. • Soft/liquid diet is preferred.⁴ • When it is insufficient to meet requirement, oral nutritional supplement (ONS) should be used to provide at least (400 kcal/day including 30 g or more of protein/day) and shall be continued for at least one month.²
	<p>Enteral Nutrition:</p> <ul style="list-style-type: none"> • If oral intake is expected to be impossible for more than three days or expected to be <50% of energy requirements for more than one week.² • Initiate within 24-36 hours of admission to the ICU or within 12 hours of intubation. • Continuous rather than bolus EN is strongly recommended.¹
	<p>Parenteral nutrition:</p> <ul style="list-style-type: none"> • Early PN should be initiated as soon as possible in the high-risk patient for whom early gastric EN is not feasible or not achieve target. * • In this unusual circumstance of COVID-19 disease where concern for ischemic bowel may be greater and a prolonged ICU stay is expected, the threshold for switching to PN may need to be lower.¹ <p>*High-risk patients include those with sepsis or shock requiring escalating or multiple vasopressors, or when high pressure respiratory support is required (NIV, CPAP, or PEEP).</p>
Timing of Nutrition Delivery	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>Start early during hospitalization (within 24-48 hours) especially for older and polymorbid patients.²</p> </div> <p>Be caution for refeeding syndrome risk (The first 72 hours of feeding is the period of highest risk), if refeeding syndrome risk is present:</p> <ul style="list-style-type: none"> • Start at approximately 25% of caloric goal (in EN/PN fed patients) with slow increase. • Frequent monitoring of serum PO₄, Mg and K⁺ levels.¹
EN Administration	<ul style="list-style-type: none"> • Infusion of formula into the stomach via 10-12 Fr feeding nasogastric tube. • Initiate with low dose 10-20 ml/h of hypocaloric or trophic- advancing to full dose EN slowly over the first week. • Nutrition requirements should take into consideration the use of propofol in terms of lipid calories and total calories needed.¹
Formula selection	<ul style="list-style-type: none"> • A standard high protein (> 20% protein) polymeric isotonic enteral formula should be used in the early acute phase of critical illness. • As the patient's status improves and vasopressor requirements abate, addition of fiber should be considered for the non-nutritional benefits to the gut microbiota. • Any supplemental nutritional modules such as protein packets or soluble fibers should be given once per day in order to cluster care.¹
Fluid Management	<ul style="list-style-type: none"> • Close communication with the medical team to manage the balance between restrictive fluid management strategy and meeting nutrition targets. • Consider 1.3-1.5 kcal/ml formula.⁵
Prone Positioning	<ul style="list-style-type: none"> • Recommend early gastric EN • Recommend keeping the head of the bed elevated (reverse Trendelenburg) to at least 10 to 25 degrees to decrease the risk of aspiration of gastric contents, facial edema and intra-abdominal hypertension.¹ • Pause EN and aspirate NGT prior to any position changes. • EN should re-commence as soon as possible after assessing NGT position. ³ • Avoid dense formula (2.0 kcal/ml)- increase enteral feeding intolerance (EFI). ^{3,5}
ECMO	<p>Recommend early low dose (trophic) EN with close monitoring for EFI and slow advancement to goal over the first week of critical illness.¹</p>

- **Gastric residual volume (GRV)** should not be utilized as a monitor of feeding tolerance. (Do not check GRVs are not reliable in ICU patient and may increase risk of virus exposure and transmission).
- Patients should be monitored by daily physical examination and confirmation of stool passage and gas.¹
- If GRV measure still utilize, use threshold off 300-500 ml with less frequent -ex. q 8 hours- (with PPE). Cease measurements when GRVs have been less than 300ml for > 48 hours.^{3,5}
- After extubating to NIV, EN should be continued until patient assessed and is managing sufficient oral intake.³

For enteral feeding intolerance (EFI):

- Use fiber free formula- reattempt fiber after GI dysfunction improves.
- Use of a prokinetic agent to enhance motility is recommended.¹
- If EFI remains an issue over 5-7 days (with <50% of prescribed targets), consider:
 - Post pyloric EN - should undergo bedside placement, using PPE with techniques that do not require use of endoscopy or fluoroscopic guidance- or PN.^{1,3}

EN should be withheld:

- Hemodynamic instability requiring vasopressor support at high or escalating doses.
- Patients on multiple vasopressor agents.
- Rising lactate levels.
- Gastrointestinal intolerance as manifested by:
 - Unexplained abdominal pain, nausea, diarrhea, significant abdominal distention, dilated loops of small and large bowel with air/fluid levels.
- Pneumatosis, intestinalis or increasing nasogastric outputs in previous 6 to 12 hours with start of trophic feeds or prior to initiation of EN*.

→EN may be initiated/restarted after the patient is adequately resuscitated and/or has been on a stable vasopressor dose with sustained mean arterial pressure of >65 mmHg.¹

*PN strongly considered

Recording percentage of calories and protein delivered should be recorded in ICU patient receiving EN or PN.¹

Enteral pump:

In case of shortage of enteral pumps, prioritize distribution for patients with small bowel feeding or those with symptoms of intolerance, and continuous gravity feeding be attempted for others.¹

Dietetic workforce:

For ICU patient:

It recommends to commencing EN support using an algorithm with a set rate for up to the first 5 days of ICU admission.

Commencement of nutrition support:

- **In MV patients who are low nutrition risk:** Conduct full nutrition assessment within **3-5 days***.
- **In high nutrition risk patients:** : Conduct full nutrition assessment within **24-72 hours***. (the Dietitian/ consultant should be contacted to determine if feeding algorithm is appropriate to use prior to commencement.

*where possible, based on dietetic capacity due to case load.

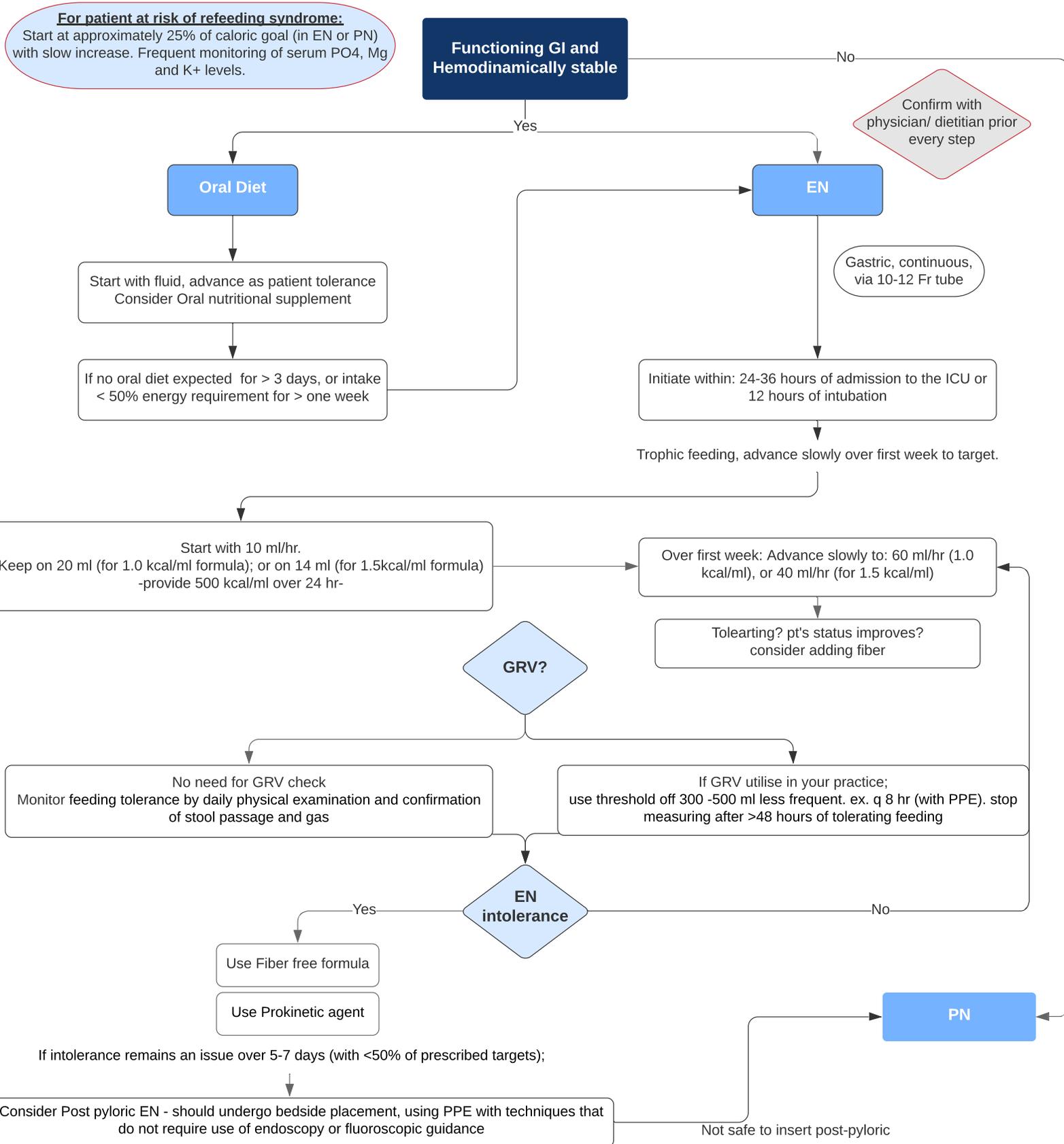
For patient transfer from ICU to ward:

- Implement local pathways to optimize nutrition provision for patients as soon as possible, prior to full nutritional assessment, where appropriate.
- Dietetic consult: for high nutrition risk patients and for low/moderate nutrition risk if intake <50% or weight loss >5% (3- 4kg) within 24 hours.
- Review high nutrition risk patients at least twice weekly and lower risk patients at least weekly.³

References: upto 6th of April 2020. ¹Martindale, R. et al. (2020) Nutrition Therapy in the Patient with COVID-19 Disease Requiring ICU Care, *SCCM and ASPEN*.
²Barazzoni, R. et al. (2020) endorsed by the ESPEN Council, Espen Expert Statements and Practical Guidance for Nutritional Management of Individuals with Sars-Cov-2 Infection, *Clinical Nutrition*. ³Chapple, L. et al (2020) Nutrition Management for Critically and Acutely Unwell Hospitalised Patients with COVID-19 in Australia and New Zealand, *AuSPEN*. ⁴Gisbertz, I. et al, (2020) Nutritional Advice for Patients with COVID-19, *NESPEN and NDIC*. ⁵Critical Care Specialist Group (CCSG) of the BDA Guidance On Management Of Nutrition And Dietetic Services During The COVID-19 Pandemic (2020)

Medical Nutrition Therapy Algorithm for COVID-19 Critical Ill Patient

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-Please use in conjunction with local nutrition policy and procedures.
 -This is based on an example providing 1440 kcal/day, tailor it according to patient's requirement. Energy need= 15-20 kcal/ABW, protein need= 1.2-2.0 g/ABW- (for obese :1.3 g/AdjBW).
 AdjBW= IBW + (ABW- IBW) * 0.33.
 -Nutrition requirements should take into consideration the use of propofol in terms of lipid calories and total calories needed.
References: ASPEN, ESPEN, AuSPEN, NESPEN and BDA resources for COVID-19 nutrition management upto 6th of April 2020.
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