

# ESPEN GUIDELINE

## on clinical nutrition in the intensive care unit



### SUMMARY

The severity of illness and the number of comorbidities encountered among adult intensive care unit (ICU) patients is increasing. The updated ESPEN guideline gives guidance on medical nutritional therapy to large heterogeneity of the critically ill patients.

The guideline defines who the patients at risk are, how to assess nutritional status of an ICU patient, how to define the amount of energy to provide, the route to choose and how to adapt according to various clinical conditions. The guideline also addresses when to start and how to progress in the administration of adequate provision of nutrients. The best determination of amount and nature of carbohydrates, fats and protein are suggested and special attention is given to glutamine and omega-3 fatty acids. The guideline also addresses conditions frequently observed in the intensive care such as patients with dysphagia, frail patients, multiple trauma patients. Abdominal surgery, sepsis, and obesity are also described to guide the practitioner toward the best evidence based therapy.



### AIM

The ESPEN guideline gives evidence-based recommendations and integrates the best and most updated knowledge from the literature, analyzed by professional methodologists and critical care nutrition experts as well by invited critical care professionals. The ultimate goal is to achieve optimal nutritional support for all ICU patients and reach the best achievable recommendations based on the current evidence and knowledge.

**Reference:** Singer et al. ESPEN guideline on clinical nutrition in the intensive care unit. In Press. Clinical Nutrition (2018) 1-32.

#### Definitions of Recommendation Grades\*

- A** At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results.
- B** A body of evidence including studies rated as 2++, directly applicable to the target population; or A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 1++ or 1+.
- O** Evidence level 3 or 4; or extrapolated evidence from studies rated as 2++ or 2+.
- GPP** Good practice points. Recommended best practice based on the clinical experience of the guideline development group.

#### Who should benefit from medical nutrition?

Medical nutrition therapy shall be considered for all patients staying in the ICU, mainly for more than 48 hours.

#### Initiation of nutrition therapy

Oral diet shall be preferred over EN or PN in critically ill patients who are able to eat.

**Grade of recommendation: GPP**

If oral intake is not possible, early EN (within 48 h) in critically ill adult patients should be performed/initiated rather than delaying EN.

**Grade of recommendation: B**

If oral intake is not possible, early EN (within 48 h) shall be performed/initiated in critically ill adult patients rather than early PN.

**Grade of recommendation: A**

In case of contraindications to oral and EN, PN should be implemented within three to seven days.

**Grade of recommendation: B**

Early and progressive PN can be provided instead of no nutrition in case of contraindications for EN in severely malnourished patients.

**Grade of recommendation: O**

To avoid overfeeding, early full EN and PN shall not be used in critically ill patients but shall be prescribed within three to seven days.

**Grade of recommendation: A**

#### Determining the energy expenditure (EE)

In critically ill mechanically ventilated patients, EE should be determined by using indirect calorimetry.

**Grade of recommendation: B**

If calorimetry is not available, using  $VO_2$  (oxygen consumption) from pulmonary arterial catheter or  $VCO_2$  (carbon dioxide production) derived from the ventilator will give a better evaluation on EE than predictive equations.

#### Energy and protein targets

If indirect calorimetry is used, isocaloric nutrition rather than hypocaloric nutrition can be progressively implemented after the early phase of acute illness.

**Grade of recommendation: O**

Hypocaloric nutrition (not exceeding 70 % of EE) should be administered in the early phase of acute illness.

**Grade of recommendation: B**

After day 3, caloric delivery can be increased up to 80–100 % of measured EE.

**Grade of recommendation: O**

If predictive equations are used to estimate the energy need, hypocaloric nutrition (below 70 % estimated needs) should be preferred over isocaloric nutrition for the first week of ICU stay.

**Grade of recommendation: B**

During critical illness, 1.3 g/kg protein equivalents per day can be delivered progressively.

**Grade of recommendation: O**

#### Use of supplemental PN

In patients who do not tolerate full dose EN during the first week in the ICU, the safety and benefits of initiating PN should be weighed on a case-by-case basis.

**Grade of recommendation: GPP**

PN should not be started until all strategies to maximize EN tolerance have been attempted.

**Grade of recommendation: GPP**

#### Use of glutamine in ICU

In patients with burns >20% body surface area, additional enteral doses of GLN (0.3–0.5 g/kg/d) should be administered for 10–15 days as soon as EN is commenced.

**Grade of recommendation: B**

In critically ill trauma, additional EN doses of GLN (0.2–0.3 g/kg/d) can be administered for the first five days with EN. In case of complicated wound healing it can be administered for a longer period of ten to 15 days.

**Grade of recommendation: O**

In ICU patients except burn and trauma patients, additional enteral GLN should not be administered.

**Grade of recommendation: B**

In unstable and complex ICU patients, particularly in those suffering from liver and renal failure, parenteral GLN- dipeptide shall not be administered.

**Grade of recommendation: A**

#### Use of EPA in ICU

High doses of omega-3-enriched EN formula should not be given by bolus administration.

**Grade of recommendation: B**

EN enriched with omega-3 FA within nutritional doses can be administered.

**Grade of recommendation: O**

High doses\*\* omega-3 enriched enteral formulas should not be given on a routine basis.

**Grade of recommendation: B**

Parenteral lipid emulsions enriched with EPA/DHA (Fish oil dose 0.1–0.2 g/kg/d) can be provided in patients receiving PN.

**Grade of recommendation: O**

#### Micronutrients, vitamins and antioxidants

To enable substrate metabolism, micronutrients (i.e. trace elements and vitamins) should be provided daily with PN.

**Grade of recommendation: B**

Antioxidants as high dose monotherapy should not be administered without proven deficiency.

**Grade of recommendation: B**

In critically ill patients with measured low plasma levels (25-hydroxy-vitamin D <12.5 ng/ml, or 50 nmol/l) vitamin D<sub>3</sub> can be supplemented.

**Grade of recommendation: GPP**

In critically ill patients with measured low plasma levels (25-hydroxy-vitamin D <12.5 ng/ml, or 50 nmol/l) a high dose of vitamin D<sub>3</sub> (500,000 UI) as a single dose can be administered within a week after admission.

**Grade of recommendation: O**

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- 37 % of calories from protein
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- MCT\*\*\* to decrease potential for fat malabsorption<sup>8</sup>
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\* Guideline highlights from Pierre Singer et al "ESPEN guideline on clinical nutrition in the intensive care unit". Clinical Nutrition 2018, 1-32, <https://doi.org/10.1016/j.clnu.2018.08.037> /©2018 European Society for Clinical Nutrition and Metabolism. Published by Elsevier Ltd.

\*\* Three to seven times 500 mg could be considered a high dose in ICU patients.

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