

# Nutrizione nel paziente critico – Il punto di vista del geriatra

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**64** CONGRESSO NAZIONALE SIGGG

*Continuità di affetti, continuità di cure*  
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Contents lists available at [ScienceDirect](#)

## Clinical Nutrition

journal homepage: <http://www.elsevier.com/locate/clnu>



ESPEN Guideline

### ESPEN guideline on clinical nutrition in the intensive care unit

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Revision of ESPEN Guidelines on Enteral Nutrition: Intensive care 2006  
ESPEN Guidelines on Parenteral Nutrition: Intensive care 2009

To determine the effect of nutrition alone on any possible outcome is complicated by the fact that the **severity of illness** and the number of **comorbidities** encountered among adult ICU patients is increasing

**Nutrition disorders and nutrition related conditions**

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graph TD; A["Nutrition disorders and nutrition related conditions"] --- B["Malnutrition/Undernutrition"]; A --- C["Sarcopenia/Frailty"]; A --- D["Overweight/Obesity"]; A --- E["Micronutrient abnormalities"]; A --- F["Re-feeding syndrome"];
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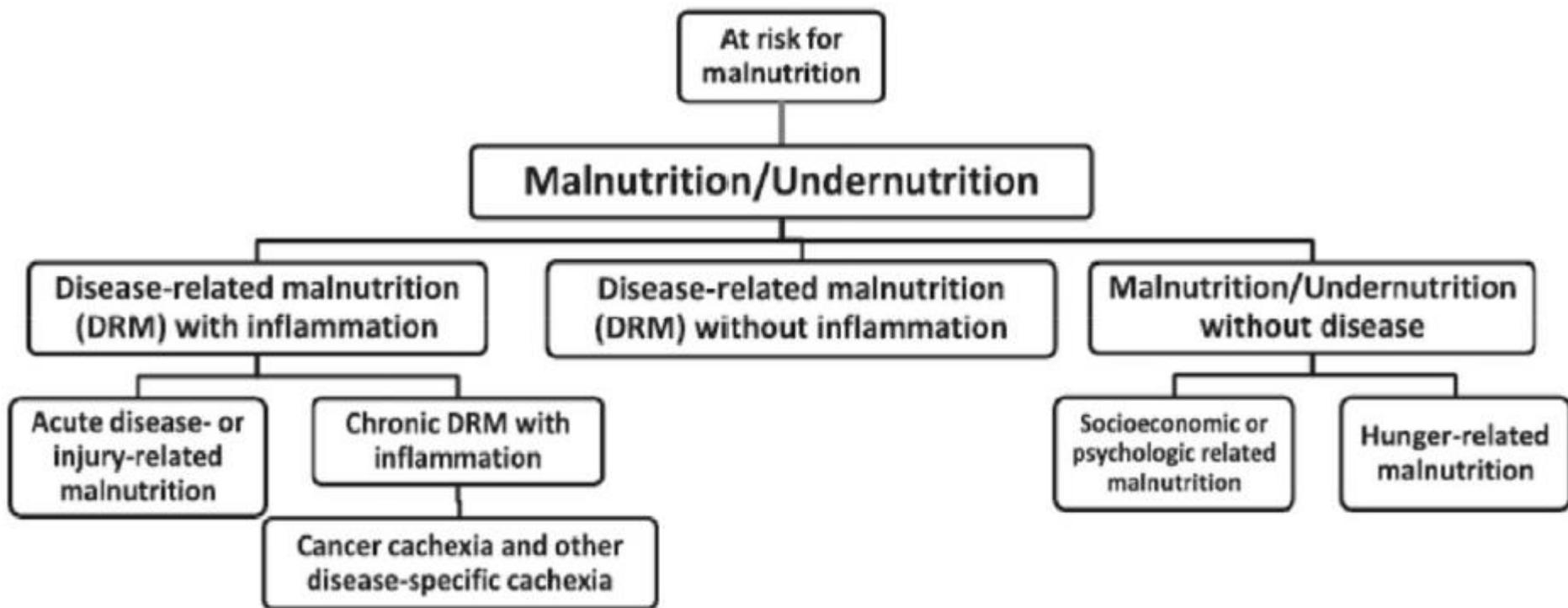
**Malnutrition/  
Undernutrition**

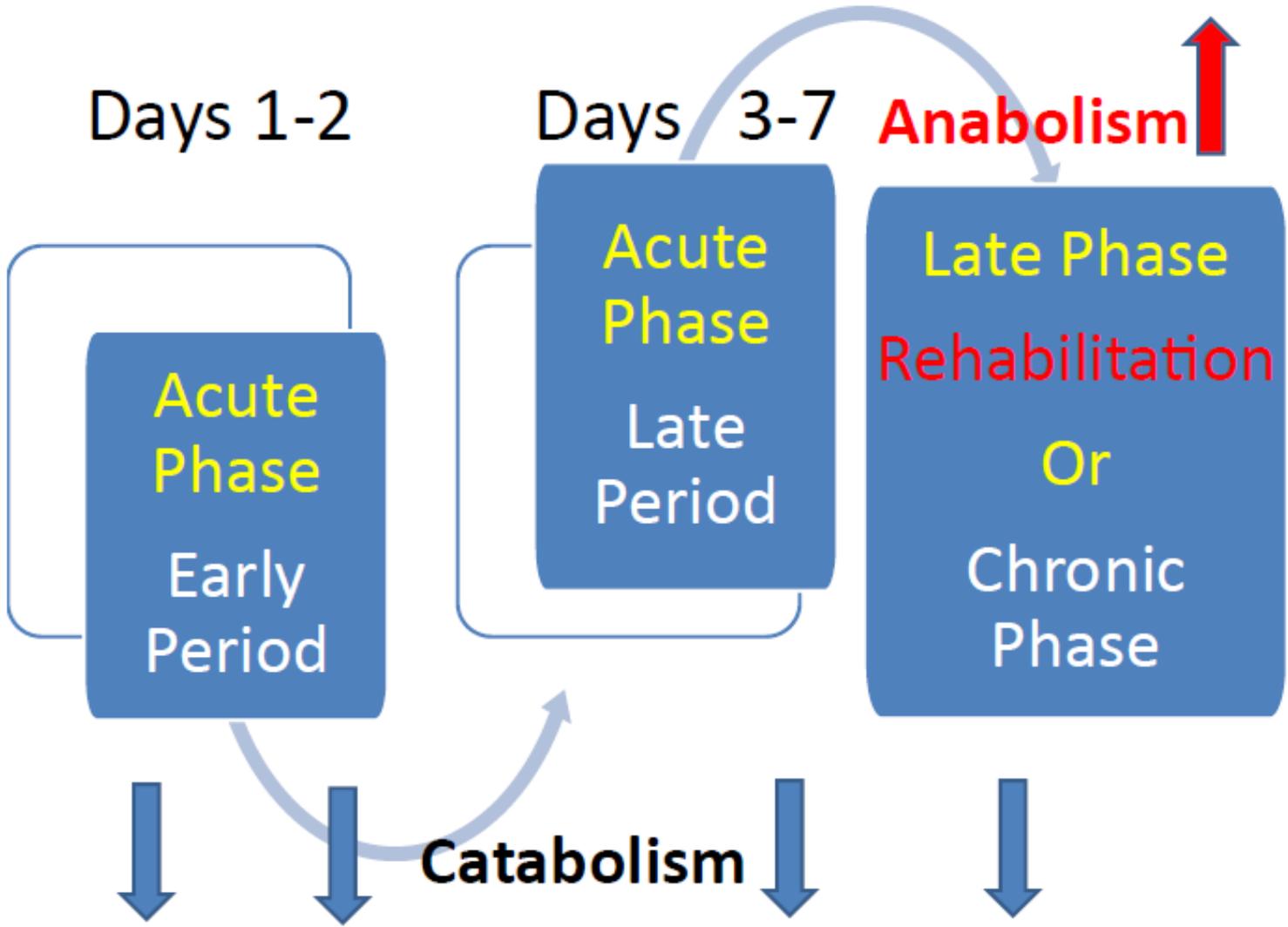
**Sarcopenia/  
Frailty**

**Overweight/  
Obesity**

**Micronutrient  
abnormalities**

**Re-feeding  
syndrome**





# **Pathophysiology of Malnutrition in Critically Ill Patients**

**Stress  
catabolism**

**Inadequate  
nutrition  
intake**

# Pathophysiology of Malnutrition in Critically Ill Patients

## Stress catabolism

Catabolic hormones

- glucagon
- cortisol
- catecholamines

Mobilize body nutrition reserves

- adipose tissue
- muscle

To generate endogenous substrate

- glucose
- amino acids
- free-fatty acids

Prioritizing delivery to

- brain
- heart

# Pathophysiology of Malnutrition in Critically Ill Patients

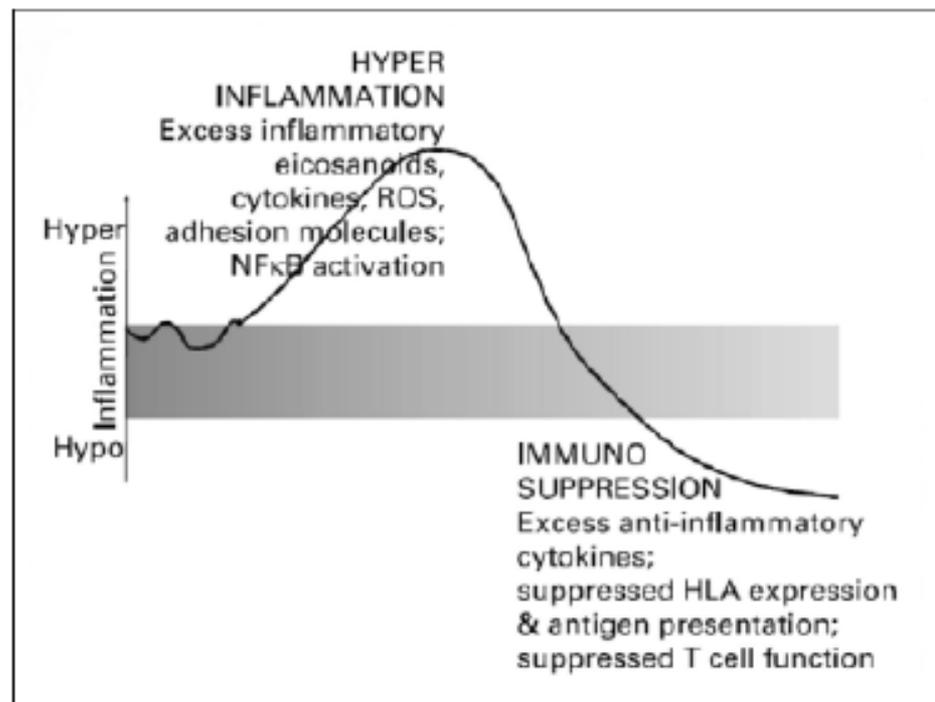
**Stress  
catabolism**

Proinflammatory cytokines

- IL-1
- IL-6
- TNF- $\alpha$

further exaggerate the catabolism process

# ALTERAZIONI IMMUNOLOGICHE



**ECESSIVA RISPOSTA INFIAMMATORIA**



SOVRA-REGOLAZIONE DEI PRINCIPALI MEDIATORI ANTI-INFIAMMATORI  
(*IL-10, PGE2 ED IL TGF- $\beta$* )



**IMMUNOSOPPRESSIONE**



**↑ RISCHIO COMPLICANZE INFETTIVE**

# Pathophysiology of Malnutrition in Critically Ill Patients

## Inadequate nutrition intake

- During such inflammatory states, the provision of nutrition is not able to completely reverse the loss of body cell mass and complications
- **At this stage**, the priority is to provide nutrition support to support vital organ system functions and preserve appropriate host responses while the underlying disease is treated

## **Pathophysiology of Malnutrition in Critically Ill Patients**

The patients **may already have malnutrition** with a reduced food intake long before ICU admission due to the underlying chronic conditions (COPD, cancer, CKD, HF) or reduced intake from a hospital stay prior to ICU admission

In the ICU, the patients may continue to have low intake, prolonged fasting or frequent feeding interruptions due to ICU procedures

**Preexisting malnutrition and iatrogenic underfeeding, may further complicate the nutrition status and worsen clinical outcomes**

## Recommendation 1

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

**Grade of Recommendation: GPP – strong consensus (100% agreement)**

No study directly address the effect of duration of **starvation** on outcome in critically ill patients (could be considered unethical)

A **careful and progressive re-introduction of nutrition** may limit the risk of **refeeding syndrome**, mainly in patients who are severely malnourished or have been in a starved state before admission

- While early EN may be of benefit, data from RCTs suggest that **attempting to achieve 100%** of estimated caloric goals in the first week of critical illness may be **harmful**
- Therefore, the initiation of EN **should not be the aggressive provision** of goal calories and protein within the first week of critical illness

For critically ill patients who are **hemodynamically unstable** and have not had their intravascular volume fully resuscitated early **enteral nutrition is contraindicated**

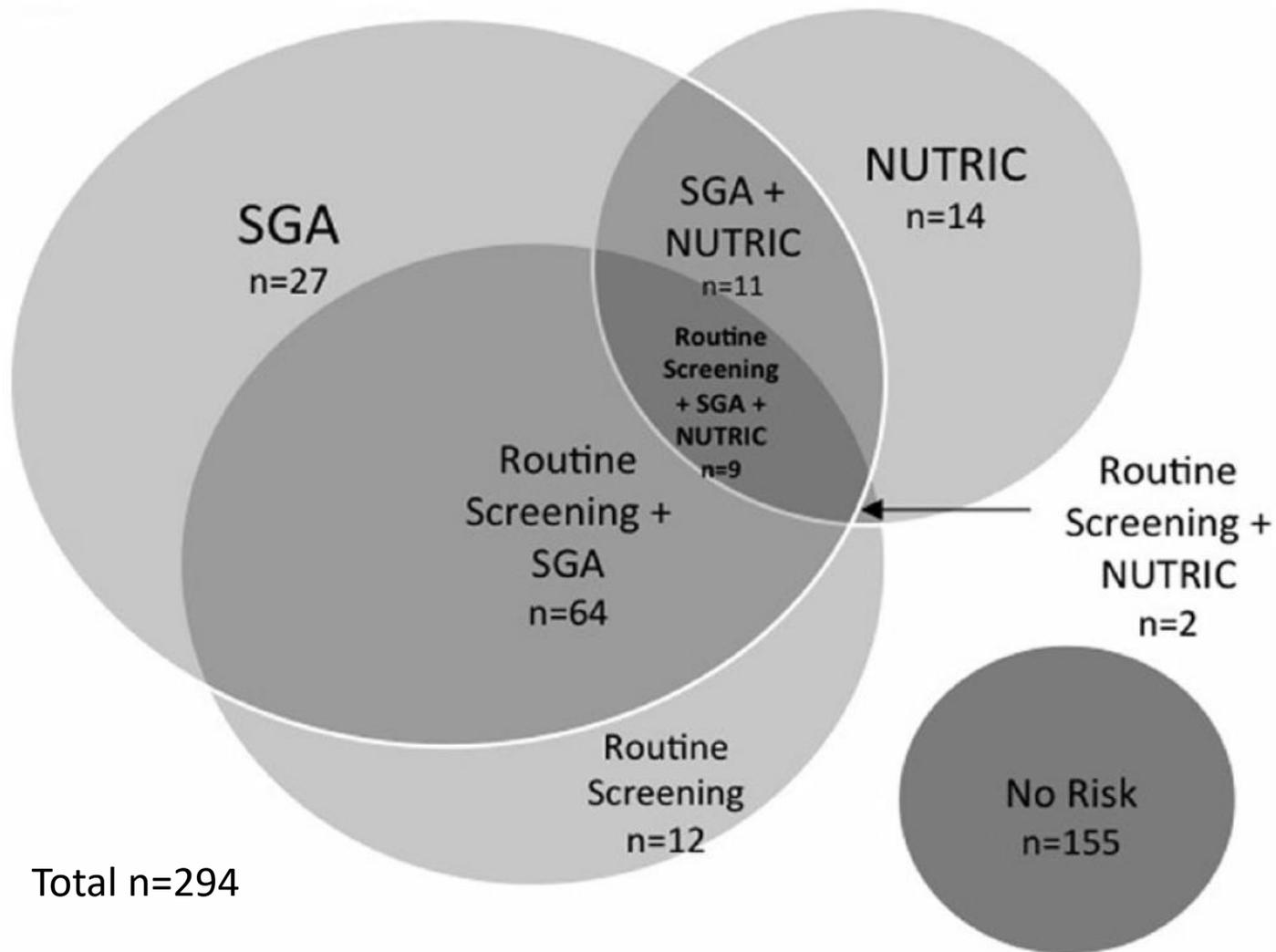
## Recommendation 2

**A general clinical assessment should be performed to assess malnutrition in the ICU, until a specific tool has been validated.**

**Grade of recommendation: GPP – strong consensus (100% agreement)**

- Weight changes are difficult to evaluate because of fluid administration and rapid wasting of lean tissues. Weight and BMI do not accurately reflect malnutrition.
- Amongst critically ill patients, decrease in muscle mass, strength and endurance, as well as mobility **make these patients very analogous to the typically frail, geriatric patient.**

# Evaluation of malnutrition risk or malnourished using the Subjective Global Assessment (SGA), routine screening, and/or NUTrition Risk in Critically ill (NUTRIC) score.



Patients with low muscle mass found at admission of ICU had a higher length of stay and higher 6-month mortality

Looijaard WG, et al. Skeletal muscle quality as assessed by CT-derived skeletal muscle density is associated with 6-month mortality in mechanically ventilated critically ill patients. Crit Care 2016;20:386.

**A definition of acute critical illness-associated malnutrition still needs to be developed**

**Every critically ill patient staying for more than 48 h in the ICU should be considered at risk for malnutrition.  
Strong consensus (96% agreement)**

Even if the evidence regarding a clear benefit from timely and tailored nutritional intervention is scarce, **minimizing (further) malnutrition** along with the **avoidance of overfeeding and complications of nutrition** during the hospital stay should be the aim for every patient in the ICU

**Mortality is not the best outcome** to assess the efficacy of a nutritional intervention considering the numerous factors influencing ICU mortality

**Long-term functional tests** might better reflect the benefit of a nutritional intervention

A **pragmatic approach** should be considered for patients at risk:

- those staying in the ICU >2 days
- undergoing mechanical ventilation
- infected
- underfed >5 days
- and/or presenting with a severe chronic disease

### **Recommendation 3**

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

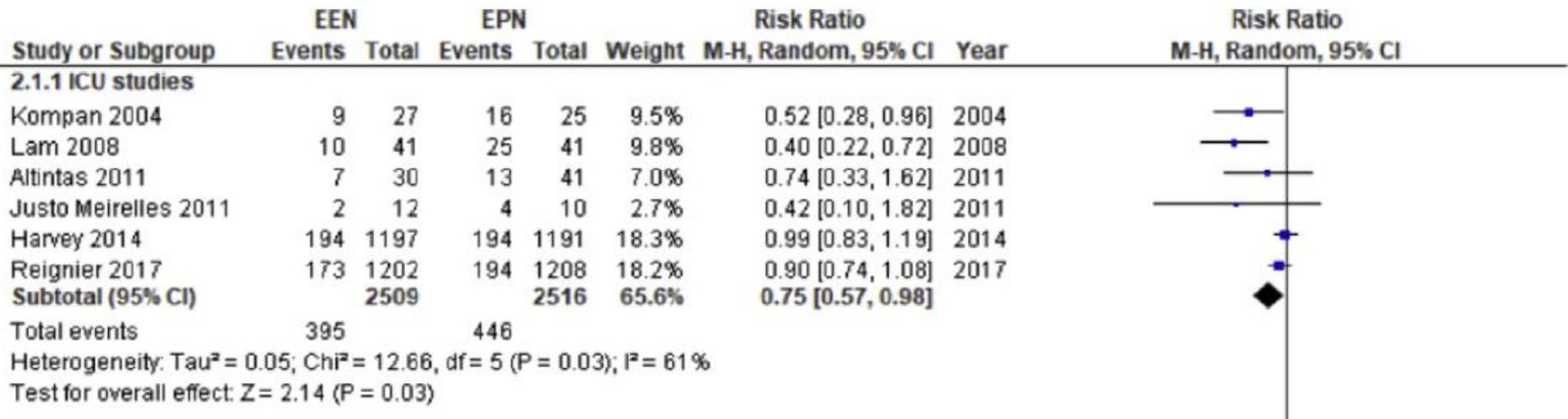
**Grade of recommendation: GPP – strong consensus (100% agreement)**

### **Recommendation 5**

**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 – strong consensus (100% agreement)**

# Meta-analysis of studies comparing infection complications in patients receiving **early enteral vs. parenteral nutrition**



# Enteral nutrition

- preserves intestinal epithelium
- stimulates secretion of brush border enzymes
- enhances immune function
- preserves epithelial tight cell junctions, and prevents bacterial translocation

## **Recommendation 6**

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

**Grade of recommendation: B – consensus (89% agreement)**

## **Recommendation 8**

**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 – strong consensus (100% agreement)**

## **Recommendation 12**

**In patients deemed to be at high risk for aspiration, post-pyloric, mainly jejunal feeding can be performed.**

**Grade of recommendation: GPP – strong consensus (95% agreement)**

## **Recommendations 42**

**In non-intubated patients with dysphagia, texture-adapted food can be considered. If swallowing is proven unsafe, EN should be administered.**

**Grade of recommendation: GPP – strong consensus (94% agreement)**

Most of the evidence related to nutrition support is from adequately nourished patients when they enter the study, **patients with malnutrition are typically excluded**

An ESPEN expert working group recommends **1.2 to 1.5 g protein/kg/day** in older people who are malnourished or at risk of malnutrition, with even high protein intake for individuals with severe illness or injury

# Chronic Critical Illness: Application of What We Know

Amir Y. Kamel, PharmD<sup>1</sup>, Cameron M. Rosenthal, MD<sup>2</sup>, Scott Brakenridge, MD<sup>3</sup>, Chasen A. Croft, MD<sup>3</sup>, Frederick A. Moore, MD<sup>3</sup>, and Martin D. Rosenthal, MD<sup>3</sup>

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- **CCI** = first mentioned by Girard and Raffin in 1985 when discussing acutely ill patients requiring ongoing support in the ICU
- >8 d in ICU with 1 of 5 eligible clinical conditions:
  - mechanical ventilation for at least 96 h in a single episode
  - tracheostomy
  - sepsis and other severe infections with multiple organ failure
  - ischemic stroke
  - intracerebral hemorrhage
  - traumatic brain injury (Khan Crit Care Med 2015)

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- **CCI** = “neuropathy of critical illness”, “myopathy of critical illness”, “ICU acquired weakness” and most recently “post intensive care unit syndrome”
- Acute exacerbations of chronic diseases, and need for prolonged mechanical ventilation

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- **PICS** = Persistent Inflammation, Immunosuppression and Catabolism Syndrome
- Unfortunately, PICS is the consequence of optimal evidence based ICU care and currently the therapies to prevent or treat CCI and PICS are limited

## **Variazioni delle caratteristiche cliniche dei pazienti ricoverati in terapia intensiva presso la Duke University**

	<b>1989-1991</b>	<b>2004-2006</b>	<b>p</b>
Mortalità in UTIC	8.8%	7.4%	0.15
Mortalità intraospedaliera	13.0%	11.4%	0.13
Charlson score	1	2	<0.001
Diabete mellito	23.1%	35.9%	<0.001
BPCO	13.9%	21.7%	<0.001
Ipertensione arteriosa	42%	55.7%	<0.001
Sepsi/shock settico	0.7%	7.9%	<0.0001
Insufficienza renale acuta	5%	17.9%	<0.0001
Insufficienza renale cronica	4.8%	23.8%	<0.0001

# ESPEN guideline on ethical aspects of artificial nutrition and hydration

Christiane Druml <sup>a,\*</sup>, Peter E. Ballmer <sup>b</sup>, Wilfred Druml <sup>c</sup>, Frank Oehmichen <sup>d</sup>,  
Alan Shenkin <sup>e</sup>, Pierre Singer <sup>f</sup>, Peter Soeters <sup>g</sup>, Arved Weimann <sup>h</sup>, Stephan C. Bischoff <sup>i</sup>

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- End of life issues and palliative medicine; dementia and specific situations like nursing care or the ICU
- Respect for autonomy as well as careful wording while communicating with patients and families
- Other bioethics principles should be considered (i.e., withholding and withdrawing of artificial nutrition and/or hydration)
- Multicultural societies may have different values and beliefs.

# Take home message

- Medical nutrition therapy of the critically ill older adult patient remains a challenge
- Most of the evidence related to nutrition support is from patients who are adequately nourished when they enter the studies. Patients with malnutrition, a frequent condition among older adults, are typically excluded.
- ICU older adult patients are a heterogeneous group and a unique recommendation for every patient and situation cannot be suggested



**Grazie per la cortese attenzione**