La Nutrizione Artificiale precoce nel paziente critico

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Malnutrizione

- Condizione di **alterazione funzionale, strutturale e di sviluppo** dell'organismo **conseguente allo squilibrio tra fabbisogni, introiti ed utilizzazione** dei nutrienti, tale da comportare un aumento di morbilità e mortalità e un'alterazione della qualità della vita
- Nel **paziente ospedalizzato** la malnutrizione è dovuta a **deficit, acuto o cronico**, sia di calorie che di proteine che configura il quadro della **malnutrizione proteico-calorica**

Malnutrizione Calorico-Proteica
Eziopatogenesi

- ↓ **apporto alimentare**
- ↓ **assorbimento**

digiuno

- ↑ **ormoni dello stress** (cortisolo,catecolamine, glucagone)
- ↑ **citochine pro-infiammatorie**

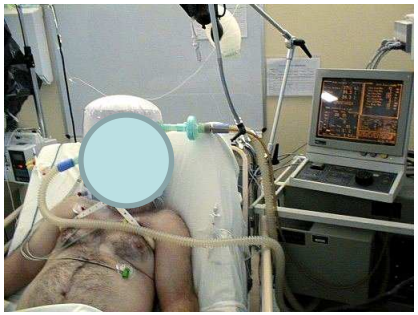
catabolismo

Risposta metabolica

	Digiuno	Catabolismo
Metabolismo basale	↓	↑↑
Proteine		
turnover	↓	↑↑
catabolismo	↓	↑↑↑
Glucosio		
produzione	↓	↑
tolleranza	=	↓ (insulino-resist.)
Lipidi		
lipolisi	↑	↑
ossidazione	↑	↑

Malnutrizione Calorico-Proteica modificazioni della composizione corporea

Causa (Deficit)	**Velocità di Sviluppo**	**Composizione Corporea**
Digiuno cronico (marasma) (Energia)	Lenta	↓↓ T. adiposo ↓ T. muscolare =↓ Albumina
Catabolismo Grave (kwashiorkor) (Proteine)	Rapido	=↓ T. adiposo ↓ T. muscolare ↓↓ Albumina
Digiuno + Catabolismo (Energia + Proteine)	Variabile	↓ T. adiposo ↓ T. muscolare ↓ Albumina



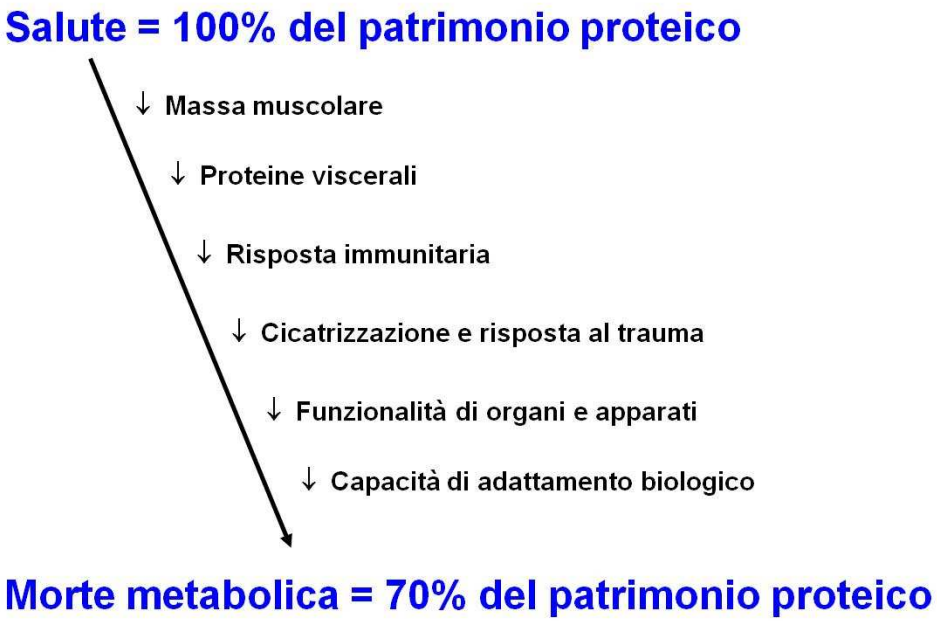
Esempi di condizioni ipercataboliche

Lieve	Moderato	Severo
flogosi cronica	chirurgia maggiore	sepsi
insuff. d'organo	complic. po magg.	trauma maggiore
chirurgia minore	Ca. polmonare	ustione 3° grado
linfoma	leucemia	
Ca. GI localizzato	Ca. disseminato	
Ca. epatico	trauma/ustione min.	
Perdita di azoto 5-10 g/die	Perdita di azoto 10-15 g/die	Perdita di azoto >15 g/die

1 g di N = 6.25 g di Pr. = 30-32 g di massa magra

Tappe verso la “morte metabolica”

Le conseguenze della malnutrizione
sono dovute e sono proporzionali
alla diminuzione del patrimonio proteico corporeo



Malnutrizione = fattore di rischio

Disease settings in which an association between higher mortality and malnutrition has been demonstrated

(Norman K et al, Clin Nutr 2008)

Chronic disease	Acute disease
Organ failure •Liver cirrhosis •Chronic liver disease (following LTX) •Terminal renal insufficiency •Chronic heart failure •Lung transplantation •Chronic obstructive pulmonary disease **Malignant disease** •Lymphoma •Acute lymphatic leukaemia •Lung cancer •Gastric cancer •Pancreatic cancer •Colon cancer **Others** •HIV/AIDS	• Alcoholic hepatitis • Community acquired pneumonia • Stroke • Critically ill

Adult starvation and disease-related malnutrition: A proposal for etiology-based diagnosis in the clinical practice setting from the International Consensus Guideline Committee☆

(Jensen GL et al, Clin Nutr 2010)

Efficacia nutrizionale del supporto nutrizionale nella malnutrizione da digiuno (SRM)

Malnutrizione da digiuno (SRM):

- la riduzione significativa di massa magra avviene in mesi
- è più lenta in caso di digiuno parziale
- **il supporto nutrizionale (NS) riesce a recuparare la perdita di massa magra**.

Adult starvation and disease-related malnutrition: A proposal for etiology-based diagnosis in the clinical practice setting from the International Consensus Guideline Committee☆

(Jensen GL et al, Clin Nutr 2010)

Efficacia nutrizionale del supporto nutrizionale nella malnutrizione da catabolismo

Malnutrizione da Catabolismo

Nella forma acuta-severa (ADRM)

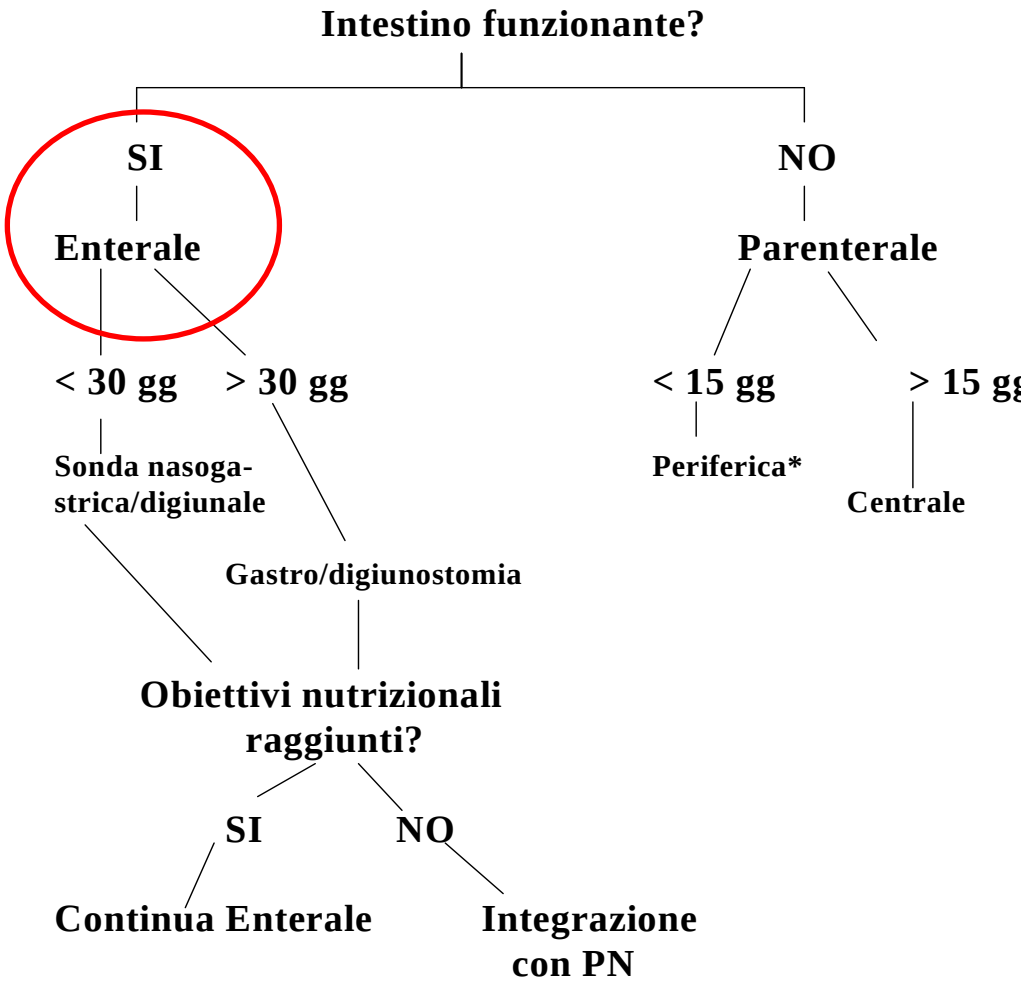
- la riduzione significativa di massa magra avviene in settimane
- **il supporto nutrizionale (NS) limita ma non recupera la perdita di massa magra**

Nella forma lieve-moderata (cronica) (CDRM)

- la riduzione significativa di massa magra avviene in mesi
- il supporto nutrizionale (NS) rallenta e può recuperare la perdita di massa magra

La NA precoce nel paziente critico

Criteri di Scelta della Nutrizione Artificiale



* Fabbisogni calorie ed elettroliti possono essere insufficienti

Early Enteral Nutrition in Critically Ill Patients With Hemodynamic Instability: An Evidence-Based Review and Practical Advice

Yang S, NCP 2014

Hemodynamic instability ➔ ↓ GI blood flow and ↓ GI motility

Vasoactive agents

- dopamine and norepinephrine ➔ ↓ **GI motility**
- dopamine, epinephrine, and vasopressin ➔ ↓ GI blood flow
- norepinephrine ➔ no effect on GI blood flow
- dobutamine and milrinone used alone ➔ ↑ GI blood flow

Initiating EEN ➔ ↑ mucosal oxygen requirements

Potential risk of nonocclusive mesenteric ischemia (NOMI) or nonocclusive bowel necrosis (NOBN) during EEN among this specific patient population

Early Enteral Nutrition in Critically Ill Patients With Hemodynamic Instability: An Evidence-Based Review and Practical Advice

Yang S, NCP 2014

EEN Dosage and Route

- EEN is administered primarily **to maintain the intestinal mucosal barrier function** rather than serve energy supplement
- **"Trophic" EN at the rate of 10 to 20 mL** per hour is utilized in patients with increased risk
- When EEN and vasoactive agents are administered together, **jejunal feeding has the highest incidence of NOBN of 0.29% to 1.14%**
- EEN by **nasogastric tube** is possibly a relatively low risk approach.

NOBN, nonocclusive bowel necrosis.

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Special Interest

The following article is one of two articles offered for continuing education credit in this issue. Please see page 382 for details.

Canadian Clinical Practice Guidelines for Nutrition Support in Mechanically Ventilated, Critically Ill Adult Patients*

Daren K. Heyland, MD, FRCPC, MSc*; Rupinder Dhaliwal, RD*; John W. Drover, MD, FRCSC, FACS†; Leah Gramlich, MD, FRCPC‡; Peter Dodek, MD, MHSc§; and the Canadian Critical Care Clinical Practice Guidelines Committee

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Invited Review

The Canadian Critical Care Nutrition Guidelines in 2013: An Update on Current Recommendations and Implementation Strategies

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Rupinder Dhaliwal, RD, BASc[1]; Naomi Cahill, RD, PhD[2]; Margot Lemieux, RD, BSc[1]; and Daren K. Heyland, MD, MSc[2]

41 recommendations

TABLE I
Language of summary recommendations

Conditions	Language of recommendation
If there were no reservations about endorsing an intervention	"Strongly recommended"
If evidence was supportive but there were minor uncertainties about the safety, feasibility, or costs of the intervention	"Recommended"
If the supportive evidence was weak and/or there were major uncertainties about the safety, feasibility, or costs of an intervention	"Should be considered"
If there was either inadequate or conflicting evidence	No recommendation, ie, "insufficient data"

When EN or PN

- We strongly recommend the use of **enteral nutrition over parenteral nutrition**
- We recommend **early enteral nutrition** (within 24-48 hours following admission to ICU)
- In patients with Acute Lung Injury, an initial strategy of trophic feeds for 5 days should not be considered

- We recommend that **parenteral nutrition not be started at the same time as enteral nutrition**
- Practitioners will have to weigh the safety and benefits of **initiating PN** in patients not tolerating EN **on an individual case-by-case basis.**

Pharmaco-nutrition

- **Enteral formula with fish oils, borage oils and antioxidants** in patients with Acute Lung Injury (ALI) and Acute Respiratory Distress Syndrome (ARDS) should be considered.
- **Caution against** the use of any **glutamine** in patients with **shock and MOF**, given the possibility of harm as demonstrated by the results of the REDOXS study of combined enteral and parenteral glutamine
- The use of **probiotics** should be considered in critically ill patients.
- The use of supplemental **combined vitamins and trace elements** should be considered in critically ill patients.
- The use **IV/PN selenium supplementation**, alone or in combination with other antioxidants, should be considered in critically ill patients.

Glucose control

- We recommend that **hyperglycemia (blood sugars > 10 mmol/L; 180 mg/dL) be avoided** in all critically ill patients and we **recommend a blood glucose target of around 8.0 mmol/L (145 mg/dL) (or 7-9 mmol/L; 125-160 mg/dL)**, rather than a more stringent target range (4.4 to 6.1 mmol/L; 80-110 mg/dL) or a more liberal target range (10 to 11.1 mmol/L; 180-200 mg/dL).