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Nutrition on ICU

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Endpoints

Student is able to describe basic pathophysiology od malnutrition

Student understands the role of nutrition in critical care

Student understands basic principles of nutrition administration on ICU

Student is able to describe main risks of feeding patient on ICU

Lecture content

Introduction

Pathophysiology

Nutritional status evaluation

Forms of nutrition

Energy and protein intake demand

Complications of nutritional support

Introduction

Critical illness leads to metabolic changes, predominantly to catabolism.

Major source of aminoacids are muscles.

Decrease in muscle mass leads to critical ilness related myopathy.

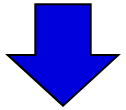
Weakness leads to many severe complikations and prolongs ICU stay.

No tools were found to prevent catabolism, but adequate nutritional support is able to mitigate its cosequencies.

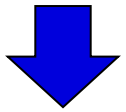
Pathophysilogy

Any critical illness leads to activation of stress reaction (SIRS).

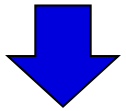
Changes in levels of cytokins, catecholamines, hormones



glukoneogenesis, proteolysis, lipolysis, hyperglycaemia



malnutricion



Decreased wound healing, immune response, longer arteficial ventilation, later mobilisation

Nutritional status assesment

Helps in early identification of malnourished patient with high risk of complications.

There is no simple acceptably sensitive parameter.

Complex evaluation of anamnesis, illness severity, physical examination, laboratory parameters.

Scoring systems are recomended.

(e.g. NUTRIC Score = age + comorbidities + lenght of hospital stay + APACHE II + SOFA + IL6)

Forms of ICU nutrition

PARTIAL vs. FULL

ENTERALLY (GIT)

per os — diet (food)
sipping (special products)

tube feeding - into stomach (naso/orogastric tube, gastrostomy)
- postpyloric (nasojejunal tube, jejunostomy)

PARENTERALLY (i.v.)

Enteral nutrition

Indicated always, when there are no contraindications, as e.g.

Decompensated shock state

Ileus

GIT Perforation

Bowl ischemia

Enteral nutrition

Content

aqua, macro- and micronutrients, alternatively fibre

1-2 kcal/ml

polymeric/oligomeric/elementary

organ specific products showed no evident benefit

Way of administration

sipping – 3-5 per day

by tube – continnuosly, boluses

Parenteral nutrition

Indicated only, if enteral feeding is contraindicated or intolerated.

Parenteral nutrition

Company products or patient specific products prepared individually in hospital pharmacy

Solutions of carbohydrates, lipids, aminoacids, ions and micronutrients (All-in-one = AIO bags)

Administered as long-term od continual infusion (no bolusis) into peripheral vein, or more usual **central vein**

EN vs. PEN

Enteral nutrition	Parenteral nutrition
physiologic	nonphysiologic
cheap	expensive
supports motility of GIT	atrophy of intestinal wall
unpredictable absorption	Exactly defined intake
risk of aspiration pneumonia	Risk of CRBSI

Energy and protein intake

Energy

- estimation according body weight (25-30kcal/kg/day)
- equationa (Harris-Benedict)
- indirect calorymetry

Proteins

- 1.2-2.0 g/kg/day

Complications of nutrition

Intolerance
- vomiting
- high gastric residual volumes
- diarrhoea
- flatulence
- abdominal pain and dyscomfort

↳ Prokinetics ➡ upper GIT (metoclopramid, erytromycin)
lower GIT (neostigmin)

Metabolic complications
- hypertriglyceridemia
- hepatopathy (elevated liver enzymes)
- hyperglycaemia

Refeeding syndrome

Overdosing of nutrion leads to metabolic changes with later depletion of e.g. P, Mg, K, ATP, vit.B_1

Clinically musle weakness, concious disorder, heart failure

Its recomended to lower the dose of nutrition and substitute depleted micronutrients

Practical approach - algorithm

Prefer enteral nutrition

Initiate after initial stabilisation (24-48h)

Step by step increasing dose to target level (during 3-5 days)

Monitoring of potential refeeding syndrome (P, Mg, K)

Monitoring of tolerance (GRV, diarrhoea…)

Take home message

Adequate nutrition is integral part of critical care.

Enteral nutrition is preferred to parenteral nutrition.

Inadequate nutrition (timing, dose, ingredients, way of administration) worsen outcome in critically ill patints.

Nutrition in critical care is accompained with potential complications, e.g. „refeeding syndrome“.

Zdroje

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