

# *Parenteral and Enteral Nutrition*



# *Preoperative Nutritional Assessment*

- weight loss over 1 month
- decreased appetite
- functional status (activities)
- related medical history, (chronic illness)
- prescribed medication, and vitamin and herbal supplements.
- nausea, vomiting, dysphagia, constipation, diarrhea and related gastrointestinal complaints.
- dentition
- daily use of alcohol
- usual foods, meal patterns, and reported intake over 24 hours? Food preferences, avoidances, and

## Diagnosis of Significant Weight Loss

<b>Time</b>	<b>Significant</b>	<b>Severe</b>
1 week	1,00%	>1%
1 month	5,00%	>5%
3 months	7,00%	>7%
6 months	10,00%	>10%

# *malnutrition*

- Up to 50% of hospitalized patients are malnourished in some form
- increased risk of postoperative complications
  - impaired wound healing and infection
  - longer hospital stays,
  - higher health costs,
  - increased morbidity and mortality

# *Marasmus*

- protein-energy malnutrition most common among the elderly
  - prominent weight loss,
  - generalized wasting,
  - normal serum proteins
  - It develops slowly over time and carries a low mortality as long as the patient is not acutely stressed.
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## □ *Kwashiorkor*

- acute malnutrition
- deficient protein intake in the setting of adequate caloric intake.
- It develops rapidly in the setting of stress combined with low intake (e.g. trauma, sepsis) and is frequently superimposed upon marasmus.

It is characterized by:

- hypoalbuminemia
- generalized edema
- The patient may appear well-nourished; no weight loss.
- increased basal metabolic rate, hyperglycemia,

## □ *Physical inspection*

- inspection of the hair, integument, eyes, oral cavity, and overall body habitus can provide valuable clues to underlying nutritional deficiency.
- Possible indicators of malnutrition include:
  - general weakness,
  - edema, pallor,
  - decubitus ulcers, petechiae, ecchymoses,
  - scaly skin, dry or greasy skin, hyperpigmented skin, poor skin turgor, fissured tongue, inflamed or bleeding gums, fissured or inflammation lips, ulceration of lips or oral mucosa, brittle hair,
  - and a variety of nail abnormalities.
- height, weight, skinfold thickness, and muscle circumference

## □ *Biochemical Indices*

- albumin – 21D halftime; marker of chronic
- transferrin, and prealbumin (\* liver)
- Nitrogen balance

[protein intake (g)/6.25 g] - [24 h U nitrogen + (2 to 4g)]

6.25 g protein = 1 g nitrogen

- total lymphocyte count (TLC) < 2000





# *Enteral Feeding - Indications*

- Inadequate oral intake
- Significant malnutrition
- Functional GI tract
- Intubated/ventilator dependent
- AIDS/HIV with concurrent malnutrition
- Cardiac or cancer cachexia
- Decreased mental status/coma
- Dysphagia/esophageal obstruction
- Head and neck surgery/cancer
- Hypermetabolism (burns, trauma, HIV)
- Inflammatory bowel disease
- Pancreatitis

# *Enteral Feeding - Contraindications for*

- Those not requiring aggressive nutritional support
  - Intractable vomiting
  - Bowel obstruction/ileus
  - Profuse diarrhea
  - Severe enterocolitis
  - Severe, active GI bleeding
  - High-output fistulas (>500cc/d)
  - Initially in short bowel syndrome
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# *Parenteral Nutrition – Indications*

- Severe malnutrition and prolonged NPO status (>5 days)
  - Significant catabolism and prolonged NPO status
  - Bowel obstruction/ileus"
  - Chronic vomiting
  - Use of GI tract contraindicated
  - Bowel rest (severe pancreatitis)
  - Malabsorption
  - Initially in short bowel syndrome
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# *Parenteral Nutrition - Contraindications*

- Functioning GI tract
  - No safe venous access
  - Hemodynamically unstable
  - Patient not desiring aggressive support
  - Anticipated treatment with TPN <5 days in patients without severe malnutrition
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# *Before anesthesia*

- NO Smoking 24 h
- NPO 6-8h
- clear wather/tea 2 h



# *Postoperative nutrition*

- Oral intake should be commenced as SOON as possible after surgery.
  - if GIT works - Start liquid, then give solid
  - Anastomosis of upper GIT – solid food delayed for several days
  - Colorectal anastomosis – solid food after first day
  - liquid supplements are easy
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## *Examples from ICU:*

Coma, 1 day after Neurosurgery

- Nasogastric tube / Jejunostomy
- i.v. Glc 10% 500ml
- start NG 10ml/h .. 60ml/h
- check Gastric residual volume

Trauma – brain, chest, abdomen,

- hemodynamically unstable – wait
  - hemodynamically stable – parenteral nutr.
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# *1 day intake*

All In One ARK Stand = 2400ml

- fixed amount of energy 1800-2400kcal
- 10-14 g nitrogen

Enteral nutrition

- up to 60ml/h





# Caloric Requirements

## Harris-Benedict equation

Males:  $BEE = 66 + (13.7 \times \text{wgt in kg}) + (5 \times \text{height in cm}) - (6.7 \times \text{age in years})$

Females:  $BEE = 665 + (9.6 \times \text{wgt in kg}) + (1.8 \times \text{height in cm}) - (4.7 \times \text{age in years})$

- basal energy expenditure (BEE) in kilocalories
- easy -  
 $BEE = 25 \times \text{weight in kg}$

Total energy expenditure = BEE x activity factor x stress factor



# *Requirements*

Energy: 25 to 35 kcal/kg/day

Protein: 1.5 to 2 g/kg/day

Water: 2ml/kg/h

Sodium: 1.0-1.4 mmol/kg/D

Potassium: 0.7-0.9 mmol/kg/D



Type of Diet	Kcal/day	Grams protein/day
Regular	2600	100
Clear liquid	1300	27
1200ml NovaSource	2400	80

## *Do not overfeed*

- more than 35 kcal/kg/day has been shown to cause increased septic and metabolic complications

