Malnutrition in the elderly - in hospital

In hospital timing and nutritional requirements of the recovery: elderly vs adults

Y. Berner (Israel)
In hospital timing and nutritional requirements of the recovery: elderly vs adults

Prof. Yitshal N. Berner M.D. MPH
Geriatric Medicine, Meir Medical Center, Kfar Saba
Sackler Medical School Tel Aviv University

30th ESPEN Congress Florence Italy
Sept. 14th 2008
Educational session: Malnutrition in the Elderly
Nutrition on Aging:

Health promotion and Preventive Medicine

Aging on Nutrition:

Clinical Nutrition and Geriatric Medicine
Hospital malnutrition

- Malnutrition in hospitalized elderly 30-60%
- During illness further decline
- Serious implication on recovery
- Elderly enter with less metabolic and functional reserves


Malnutrition

• Imbalance between intake and requirements.
• Results in:
  1. altered metabolism
  2. Impaired function
  3. Loss of body mass
Weight Loss
Summary of 5 studies on 448 subjects: in and out patients, mean age > 62.

- Neoplasm 6-36%
- Gastrointestinal 6-18%
- Endocrine 4-10%
- Cardiopulmonary 2-14%
- Psychiatric 9-42%
- Others 8-22%
- Unknown 10-36%
Failure to thrive-FTT in elderly

1. Low nutritional parameters
2. Active disease
3. Depression

• Contra version about definition but not to altitude
Non Specific and Altered Presentation of Disease.

• Locus of deficit is less reliable guide in elderly, vulnerable systems decompensate from systemic disease, usually in the weakest link.

• Painless MI Bayer AJ JAGS 1986:34,263
• Latent Pneumonia. Osler W
Functional Loss
Abrupt Functional loss-Reliable Sign of Disease

- Final common pathway in clinical problems.
- Decrease ability to meet one’s own needs.

Measurments:
- ADL, IADL,Cognition with different tools.

Sole manifestation of Disease.
- Eating disorders.
- Falls.
- Confusion
- Lethargy
- Dizziness
- Incontinence.

Interaction disease – function in elderly

- Malnutrition
- Renal failure
- CHF
- COPD
- Diabetes
- Infection
- Anemia
- Polypharmacy
- FRAILTY
  - Strength
  - Balance
  - Gait
- BEHAVIOR
  - Delirium
  - Depression
- FUNCTION

10/19/2008  Yitshal Berner M.D. MPH
Diseases Associated with Increase in Nutritional Needs.

- Severe Congestive Heart Failure - CHF.
- Chronic Obstructive Airways Disease.
- Thyrotoxicosis.
- Infections.
- Parkinson.
- Inflammatory diseases.
- Malignancies.
Drug related side effects on nutrition

Chemotherapy
Narcotics
Antibiotics (eg Vit K)
Neuroleptic
Digoxin and anti arrhythmic
Ace inhibitors
Drugs affecting liver and kidney metabolism
In elderly-special consideration

1. Delirium
2. Dentition
3. Immobilization
4. Anorexia
5. Increased drug effect
6. Socio economic status
Hospital routines leading to insufficient intake

- NPO
- Blood sampling on fasting state
- Drug delivery timing
- Early dinner
- Short intervals between meals
- Prolonged night fasting
- Adjustment reaction
Disease has the potential to aggravate malnutrition-three A’s

• Response to stress may alter:

1. Appetite.
2. Absorption
3. Assimilation of nutrients
### Multidiscipline length of stay - LOS

**21 century Internal Medicine wards**

<table>
<thead>
<tr>
<th>Author</th>
<th>Country</th>
<th>n</th>
<th>LOS no malnut</th>
<th>LOS malnut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edington</td>
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<td>850</td>
<td>5.7</td>
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<td>9348</td>
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<td>Schweiz</td>
<td>652</td>
<td>5.1</td>
<td>10.2</td>
</tr>
<tr>
<td>Pirlich</td>
<td>GE</td>
<td>1886</td>
<td>11</td>
<td>15</td>
</tr>
</tbody>
</table>

The shorter LOS, the larger is the effect of malnutrition.
Neuropharmacological Changes in Alzheimer Disease-Associated with Anorexia.

- Decrease in Neuropeptide Y in the cortex.
- Decrease in norepinephrine in the hypothalamus.
- Increase in Cholecystokinin: CCK.
- Increase in Corticotropin Releasing Factor
Sarcopenia

• Age related decline in muscle mass among the elderly. *Irwing Rosenberg 1989*

• Loss of muscle strength and functional quality in addition to loss of muscle proteins. *Shwartz 1997.*
Rate of sarcopenia

- Over the age of 50:
- Loss of muscle mass 1-2% a year
- Loss of strength 1.5% (3% over 60)

- Rate higher in sedentary
- Rate twice faster in male
# Sarcopenia levels

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-75</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>&gt;80</td>
<td>50%</td>
<td>40%</td>
</tr>
</tbody>
</table>
Muscle in animal studies

- Higher leucine is required to stimulate protein synthesis in animals with aging.
- *May be because of reduced blood flow.*

- *Dardevet D 2000*
Metabolic Response to Starvation and Trauma

<table>
<thead>
<tr>
<th></th>
<th>Starvation</th>
<th>Trauma or Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic rate</td>
<td>↓</td>
<td>↑↑</td>
</tr>
<tr>
<td>Body fuels</td>
<td>conserved</td>
<td>wasted</td>
</tr>
<tr>
<td>Body protein</td>
<td>conserved</td>
<td>wasted</td>
</tr>
<tr>
<td>Urinary nitrogen</td>
<td>↓</td>
<td>↑↑</td>
</tr>
<tr>
<td>Weight loss</td>
<td>slow</td>
<td>rapid</td>
</tr>
</tbody>
</table>

The body adapts to starvation, but not in the presence of critical injury or disease.

# Sarcopenia, Anorexia of Aging Cancer Cachexia-Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Anorexia of Aging</th>
<th>Sarcopenia</th>
<th>Cancer Cachexia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Loss</td>
<td>Gradual</td>
<td>Gradual</td>
<td>Marked</td>
</tr>
<tr>
<td>Adipose Tissue</td>
<td>Yes</td>
<td>Minimal</td>
<td>Yes</td>
</tr>
<tr>
<td>Muscle Mass</td>
<td>Minimal</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Intake</td>
<td>decreased</td>
<td>unchanged</td>
<td>Markedly decreased</td>
</tr>
</tbody>
</table>
# Sarcopenia, Anorexia of Aging Cancer Cachexia - Clinical

<table>
<thead>
<tr>
<th></th>
<th>Anorexia of Aging</th>
<th>Sarcopenia</th>
<th>Cancer Cachexia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Taste and Smell</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Early Satiation</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### Sarcopenia, Anorexia of Aging Cancer Cachexia: Metabolic Changes

<table>
<thead>
<tr>
<th></th>
<th>Anorexia of Aging</th>
<th>Sarcopenia</th>
<th>Cancer Cachexia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytokines</td>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Increased</td>
</tr>
<tr>
<td>CCT</td>
<td>Increased</td>
<td>No change</td>
<td>No change</td>
</tr>
<tr>
<td>Leptin</td>
<td>Increased</td>
<td>No increase</td>
<td>Possible increase</td>
</tr>
<tr>
<td>Testosterone</td>
<td>Decreased</td>
<td>Decreased</td>
<td>Decreased</td>
</tr>
<tr>
<td>Albumin decrease</td>
<td>late</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>
Acute Illness & Hospitalization
As cause of malnutrition in the elderly.

- Failure to maintain adequate intake.
- Failure to consider increased requirements.
- Iatrogenic (NPO).
- Delay in nutritional support

- Leading to accelerated Failure to Thrive.
Refusal to Eat

• Way of expression

• Depression

• Dementia
Control Food Consumption:
Young & Roberts JAMA 1994.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Young</th>
<th>Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease energy:</td>
<td>Weight decreases.</td>
<td>Weight decreases.</td>
</tr>
<tr>
<td>Free Feeding:</td>
<td>Weight increases &amp; balances.</td>
<td>Weight continues to decrease.</td>
</tr>
<tr>
<td>Increase energy:</td>
<td>Weight increases..</td>
<td>Weight increases.</td>
</tr>
<tr>
<td>Free Feeding:</td>
<td>Weight decreases &amp; balances.</td>
<td>Weight continues to increase.</td>
</tr>
</tbody>
</table>
Dysphagia
Swallowing Mechanism

- **Structure:**
  Muscles, Fibrotic tissue, Cartilage.

- **Function:**
  Feedback neurological mechanism controlled by CNS.

- **Changes with aging:**
  - Decreased mass.
  - Lower nerve conduction velocity.
  - CNS damage: CVA, ALS, Parkinson, Alzheimer.
  - Deconditioning.
Dysphagia

• Dysphagia in elderly with dyspnea and dehydration:

• Manifestation of: functional reserve deterioration - in stress, DECONDITIONING, and must not be a manifestation of bulbar pathology.

• Longeman, 1993.
Rehabilitation in Dysphagia

Role of interdisciplinary team:

- Geriatritian: *Neurological diagnosis*
- Nurse Geriatrition: *Functional skills*
- Physiotherapist: *Improving muscular power*
- Occupational Therapist: *Eating devices*
- Speech therapist: *Swallowing*
- Social worker: *Social support*
- Nutritionist: *Appropriate & nutritional diet*
Metabolic Response to Trauma

Diagram showing energy expenditure over time with two phases:
- Ebb Phase
- Flow Phase

Reaction to stress

Effect of cytokines

Raised blood lipids

Fever

Glucose synthesis ↑

↑ Production of oxidant molecules

Effects of cytokines TNF, IL-1 and IL-6, during injury and infection

Plasma copper
Plasma zinc
Plasma iron ↓

↑ Acute phase proteins

Appetite loss and lethargy

Loss of lean tissue and fat

Figure 2.20. Effects of pro-inflammatory cytokines in infection, injury and inflammatory disease (TNF – tumour necrosis factor, IL-1 – interleukin-1, IL-6 – interleukin-6).
Metabolic Response to Trauma

Endocrine Response

Fatty Deposits
Liver & Muscle (glycogen)
Muscle (amino acids)

Fatty Acids
Glucose
Amino Acids
Metabolic Response to Trauma: Ebb Phase

• Characterized by hypovolemic shock
• Priority is to maintain life/homeostasis
  - Cardiac output
  - Oxygen consumption
  - Blood pressure
  - Tissue perfusion
  - Body temperature
  - Metabolic rate
Metabolic Response to Trauma: Flow Phase

- ↑ Catecholamines
- ↑ Glucocorticoids
- ↑ Glucagon
- Release of cytokines, lipid mediators
- Acute phase protein production
Catecholeamines-with Aging

Supiano & Hogikyan 1994

- Arterial Plasma NE pg/ml
  - Young: 216
  - Old: 362
- Extravascular NE release rate mcg/min/m²
  - Young: 1.2
  - Old: 1.8
- Metabolic clearance rate l/min/m²
  - Young: 1.14
  - Old: 0.94
- Volume of distribution l/m²
  - Young: 3.2
  - Old: 2.6
Daily Production of Thyroid Hormones with Aging

- Half life of $T_4$ increases:
  - 6.7 days at third decade
  - 9.1 days at seventh decade

- Decreased peripheral monodeiodination may explain decreased destruction (*Moradies 1994*)

- $rT_3$ is not changed in healthy elderly
# Daily Production of Thyroid Hormones with Aging

<table>
<thead>
<tr>
<th></th>
<th>Young</th>
<th>Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_3$</td>
<td>30 μg</td>
<td>20 μg</td>
</tr>
<tr>
<td>$T_4$</td>
<td>80 μg</td>
<td>60 μg</td>
</tr>
<tr>
<td>Hormone</td>
<td>AGING</td>
<td>Change starvation</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Norepinephrine</td>
<td>Higher</td>
<td>↑</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>Higher</td>
<td>↑</td>
</tr>
<tr>
<td>Thyroid Hormone T4</td>
<td>Imbalanced</td>
<td>↓↓↓↓</td>
</tr>
</tbody>
</table>

Cortisol in Aging

- Increased level with aging
- Decreased receptor number-negative feedback on hypothalamus
- Associated with hippocampal damage
- Decreased release rate
- Daily increased levels
- decreased night nadir (Vancouver 1996)
DHEA-DHEAS and Aging

- Immune function $\uparrow$
- Lipids $\downarrow$
- Bone density $\uparrow$
- Memory $\uparrow$
- Obesity $\downarrow$
- Muscle mass $\uparrow$
- REM sleep $\uparrow$
- Carcinogenesis $\downarrow$
Stress fasting

- **Liver**
  - Glucose 140 g
  - AA 250 g
  - FA 20 g + glycerol

- **Glucose 200 g**

- **Ischemic tissue**
  - Lactate

- **Periphery**

- **Fat**

- **Gluconeogenesis**

- **Ketogenesis**

10/19/2008  Yitshal Berner M.D. MPH
# Body Composition Changes in Normal Adult Males

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Muscle (kg)</th>
<th>Body fat (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>40-49</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>60-69</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>70-79</td>
<td>13</td>
<td>25</td>
</tr>
</tbody>
</table>

Young 1992
Catabolic effects of stress mediators

- IL-1
- IL-6
- TNF
- Steroids
- Catecholamines
Anorexia

Muscle wasting

↓ Nitrogen retention

↓ Albumin synthesis

↓ Circulating levels of Albumin & Cholesterol

CYTOKINES and FOOD INTAKE

IL-1
IL-2
IL-6
TNF-α
CNTF

Extravasation of albumin from intravascular space

↓ Circulating levels of Albumin & Cholesterol

IL-1
IL-2
IL-6
TNF-α
CNTF

Muscle wasting

↓ Nitrogen retention

↓ Albumin synthesis

↓ Circulating levels of Albumin & Cholesterol

CNTF – ciliary neutrophic factor
albumin from

IL-1
IL-2
IL-6
TNF-α
CNTF

Muscle wasting

↓ Nitrogen retention

↓ Albumin synthesis

↓ Circulating levels of Albumin & Cholesterol

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IL-2
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↓ Albumin synthesis

↓ Circulating levels of Albumin & Cholesterol

CNTF – ciliary neutrophic factor
albumin from
Immune Response and Nutrition

stimulation

suppression
Nutrients Related to Immune-Inflammatory Response

- IMMUNE STIMULATING
  - Arginine
  - RNA
  - Fe
  - Glutamine

- ENERGY SUPPORT
  - Glutamine

- ANTI-INFLAMMATORY
  - EPA
  - GLA
  - antioxidants

- ANTI-OXIDANT
  - Vit. E, A, C
  - Selenium
  - Taurine
Stress fasting

In elderly

CHO

fluid retention
visceral protein depletion
muscle depletion
decreased immunity
loss of adaptation
death

Less tissue
Less muscle

energy source

proteins

1. day
1. week
2. week

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faster

fat
Malnutrition and acute illness in adults and

In aging

Table 2.15. The difference in the response of well nourished and malnourished subjects to acute illness (elective operation, infection disease, moderate trauma).

<table>
<thead>
<tr>
<th></th>
<th>Well nourished</th>
<th>Severe malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein catabolism</td>
<td>Appropriate to needs</td>
<td>Insufficient for needs</td>
</tr>
<tr>
<td>Muscle strength</td>
<td>Adequate</td>
<td>Inadequate to an illness</td>
</tr>
<tr>
<td>Septic complications</td>
<td>Low</td>
<td>Frequent</td>
</tr>
<tr>
<td>Bed sores</td>
<td>Rare</td>
<td>Frequent</td>
</tr>
<tr>
<td>Wound healing</td>
<td>Normal</td>
<td>Delayed</td>
</tr>
<tr>
<td>Hospital stay</td>
<td>Normal</td>
<td>Prolonged</td>
</tr>
<tr>
<td>Rehabilitation potential</td>
<td>Normal</td>
<td>Impaired</td>
</tr>
</tbody>
</table>
Nutrition Support

• Dietary Manipulation
• Swallowing rehabilitation
• Additional nutrients - different forms
• Artificial food - Medical food
• Active support: Enteral Feeding TPN
Early Enteral Nutrition Reduces Resting Metabolic Expenditure (RME) Under Experimental Conditions

Animal Study

Day 2  Day 6  Day 9  Day 13

Early Feeding Group 175 kcal/kg/day, 2 hr – 14 days
Delayed Feeding Group I 175 kcal/kg/day, 3 – 14 days
Delayed Feeding Group II 200 kcal/kg/day, 3 – 14 days

Early Nutrition and Elective GI Surgery

Method: Meta-analysis of 11 studies (837 patients)
Early enteral nutrition (up to 24 hrs post-op) vs. NPO and elective surgery with jejunal enteral nutrition and/or oral nutrition

Results:
Decreases in:
- Rate of infection (p<0.05)
- Hospital stay (p<0.05)
- Anastomosis dehiscence
- Infection of surgical wound, pneumonia, intra-abdominal abscess
- Mortality

Increase in risk of vomiting with early enteral nutrition (p<0.05)

Conclusion: There are no advantages to fasting after surgery with elective gastrointestinal resection. Early enteral nutrition can be beneficial.
Perioperative nutrition

Nutrition risk in elderly
- Insufficient intake
- Unintended weight loss
- BMI < 20
- Severe neurological dysphagia
- Dementia

Nutrition Support
- EN preferred on PN

Surgery with significant metabolic effect

NPO
- Period longer than 5-7 days

Encourage Oral feeding
Gariballa S Clin Nut 2008

- Supplements to elderly with FTT
- (995 kcal, including 50g protein’ added vitamins and minerals)
- After 6 months-
  1. Significant change in Albumin
  2. Significant improvement in mood
  3. No other changes in cognition and nutrition measurements in 3 and 6 months

**Intervention**

Additional 500 kcal and 21 g proteins to hospitalized elderly in order to prevent malnutrition in 80 elderly over the age of 75. MNA defined similar intervention and control groups.
Results

• After 60 days significant decrease in 2 kg in the controls’ no significant weight loss in intervention.
• MNA was significantly higher in intervention
Contra-version about supplementation

• Elders may reduce their other energy intake in response to supplementation.

• *Fiatarone MA 1994*
Contraindication to: Artificial Nutrition Support:

Assisted nutrition and hydration should change the outcome

- Limited life expectancy (R)
  - Ceasing to drink or eat in the last few days of life is part of dying process
  - Failure to process fluid and food
- Failure to improve quality of life (R)
  - Advance dementia
Contraindication to: Enteral Feeding

- Gut obstruction (A)
  - Gut pseudobstruction (R):
    - Severe hypomotility
    - Persistent nausea and/or vomiting
    - Intolerable post-prandial pain diarrhea or dumping
- Mal-absorption (R)
- High output fistula (R)
- Short bowel (R)
- GI bleeding (R)
- Pancreatitis (R)
Where is the Line?

- When the role of curative treatment has been completed?

- Problems with: patients, family, team, public opinion.
Where is the Line?

• Problems with:
  • patients, suffering
  • family, not accepting
  • team, exhausted
  • public opinion, ignoring
AGS maintenance treatment  
J. Oslender 2006

• Patient in nursing home are there for the rest of their life for quality of life and not for prolongation of life.

• Decision has to be made if patient is in need for nursing home treatment.

• Nevertheless many of them are coming to hospitals and decision has to be done there.
NHO guidelines

- Bed or chair bound
- ADL dependent
- Incontinent
- Unable to communicate

Rate of FTI in the US

*Dosa DM, JAGS S2 P5 2008*

• Among the 50 leading hospitals for geriatric care in the US (according to US news and world report), there is striking variability in the rate of feeding tube insertion-FTI.

• A lower rate of FTI was correlated with other indicators of less aggressive care.
HOLISTIC VIEW

Comprehensive Geriatric Assessment

Health Care Goals and Value

- Functional
- Physical
- Cognitive
- Psychological
- Socio-economic
### The Four Principles of Medical Ethics

**Helsinki treaty 1969**

<table>
<thead>
<tr>
<th>Does not depend on care giver</th>
<th>Depends on care giver</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Patient’s Autonomy</td>
<td>• Beneficence</td>
</tr>
<tr>
<td>• Social Justice</td>
<td>• Non Malefficience</td>
</tr>
</tbody>
</table>

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Yitshal Berner M.D. MPH
Beneficience

Ability of the intervention to have positive effect on:

- Physiological parameters
- Functional parameters
- Psychological parameters
- Social parameters
- Patient’s comfort
What to ask ourselves?

1. Does the patient suffer from a condition that is likely to benefit from nutrition support?
2. Will nutritional support improve outcome and/or accelerate recovery?
3. Does the patient suffer from an incurable disease, but one in which quality of life and well-being can be maintained or improved by EN?
4. Does the anticipated benefit outweigh the potential risks?
NUTRITION = Food x Eating
ESPEN Guidelines Enteral Nutrition: Geriatrics


Can EN improve energy and nutrient intake in geriatric patients?

- EN (ONS and/or TF) increases energy and nutrient intake in geriatric patients (Ia). PEG feeding is superior to nasogastric feeding in this respect (Ia).
Does Tube Feeding may prevent the consequences of malnutrition?

- There is no published observations providing direct evidence that wasting is a cause of death and that reversal of wasting improves outcomes

Does Tube Feeding may prevent the consequences of malnutrition?

- 40 patients mainly with neurological conditions, in nursing home with abnormal markers of nutritional state: no effect on clinical outcomes with provision of increased nutrients

Can EN maintain or improve the nutritional status of elderly patients?

- ONS can maintain or improve nutritional status (Ia). Several studies have shown that TF also maintains or improves nutritional parameters irrespective of the underlying diagnosis. The metabolic consequences of ageing leading to sarcopenia and a severely reduced nutritional status at the time of tube placement can impair or even prevent successful nutritional therapy (III).
Does EN reduce length of hospital stay?

- In geriatric patients, length of hospital stay is determined not only by nutritional status but also by other factors. Available results concerning the effect of EN on length of hospital stay are, therefore, conflicting.
Does EN improve quality of life?

• The effect of ONS and TF on quality of life is uncertain.
Does EN improve survival in geriatric patients?

- ONS improve average survival (Ia). In patients who need TF due to the severity of disease, an increase in survival is not proven.
. Is EN indicated in patients with undernutrition?

- Undernutrition and risk of undernutrition represent essential and independent indications for EN in geriatric patients. ONS is recommended in order to increase energy, protein and micronutrient intake, maintain or improve nutritional status, and improve survival in patients who are undernourished or at risk of undernutrition (A). ONS and/or TF are recommended early in patients at nutritional risk (e.g. insufficient nutritional intake, unintended weight loss > 5 % in 3 months or > 10 % in 6 months, BMI < 20 kg/m²) (B).
Is EN indicated in geriatric patients with neurological dysphagia?

• In geriatric patients with neurological dysphagia, EN is recommended in order to ensure energy and nutrient supply and, thus, to maintain or improve nutritional status (A). For long term nutritional support PEG should be preferred to NGT, since it is associated with less treatment failures, better nutritional status (A), and it may also be more convenient for the patient. In patients with severe neurological dysphagia TF has to be initiated as soon as possible (C). EN should accompany intensive swallowing therapy until safe and sufficient oral intake is possible (C).
Is EN indicated after orthopaedic surgery in geriatric patients?

- ONS are recommended in geriatric patients after hip fracture and orthopaedic surgery in order to reduce complications (A).
Is EN indicated in the perioperative phase of major surgery in geriatric patients?

• There is no evidence that nutritional therapy in elderly patients undergoing major surgery (e.g. pancreatic surgery, head and neck surgery) should be different from that in younger patients. We therefore refer to the chapter “Surgery and Transplantation” in these guidelines.
Is EN indicated in elderly patients with depression?

- EN is recommended in depression in order to overcome the phase of severe anorexia and loss of motivation. (C)
Is EN indicated in geriatric patients with cancer?

- In principal, nutritional therapy in geriatric patients with cancer does not differ from younger cancer patients
Can EN prevent or improve pressure ulcers in geriatric patients?

- ONS, particular high protein ONS, can reduce the risk of developing pressure ulcers (A). Based on positive clinical experience, EN is also recommended in order to improve healing of pressure ulcers (C).
Is EN in geriatric patients associated with specific complications?

- Complications of EN are similar to those in other age groups (cross reference). There is no information available about the prevalence of specific complications in different age groups.
Complications of NGT

• **Medical**: Aspirations, clogging, agitation, diarrhea.

• **Agitation**: self extubation, restraints

  ↓

  immobilization and other complications
PEG-Procedure related complications

- Gastric perforation
- gastric bleeding
- hematoma
- wound infection
- gastrocolic fistula
- buried bumper syndrome
- jaundice
- ileus
- esophageal perforation
Gastrocolic fistula

Abdominal computed tomography scan showing the percutaneous endoscopic gastrostomy tube traversing the transverse colon.

Picture taken during colonoscopy showing the feeding tube clearly traversing the anterior and posterior walls of the transverse colon.
Treatment of elderly in hospital

1. CGA to decide on mode of treatment: curative or palliative
2. Nutrition is adjuvant to any active medical therapy
3. If active therapy is the decision, nutrition treatment has to be more vigorous.
4. Consideration of special needs during acute illness
5. Consideration of anabolic needs during sub acute phase of disease
Thank you!