**Malnutrition in the Elderly**

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**Educational Objectives**  
By the end of this activity, the participant should be better able to:  
1. Discuss nutritional factors in the elderly.  
2. Learn how to screen for nutrition problems in the elderly.  
3. Administer treatment options for malnutrition in the elderly.

**Speaker Disclosure**  
Dr. Moquist has disclosed that he has no actual or potential conflict of interest in relation to this topic.
MALNUTRITION IN THE ELDERLY
Dale C. Moquist, MD
Texas Family Symposium
June 3, 2016

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TOPICS COVERED

Age-Related Nutritional Changes
Screening and Assessment
Nutritional Syndromes
Nutritional Interventions
Summary

AGE-RELATED NUTRITIONAL CHANGES

Body Composition
Energy Requirements
Macronutrient Needs
Micronutrient Needs
Fluid Needs

ARS Question 1
With regard to protein and energy requirements of adults > 75 years old, which of the following statements is true?

1. Resting energy expenditure increases in older adults
2. Energy expenditure of activity accounts for a significantly greater proportion of total daily energy expenditure for older men than for younger men.
3. Older adults need proportionately lower amounts of protein in their diets that younger adults.
4. The most physically active older adults on average lose similar muscle mass over time compared with more sedentary adults.
Body Composition

- Decrease in bone mass, lean mass, and water content
- Increase in body fat commonly with intraabdominal fat stores
- Creatinine-based determinations
  Overestimate renal clearance
- Can NOT generalize well-standardized nutrient requirements of young or middle-aged adults to older adults

Energy Requirements

- Reduced basal metabolic rate reflects loss of lean body mass including muscle mass
- Resting energy expenditure is principal determinant of total energy expenditure
- Physical activity is the most variable component
- Energy Needs: 25-30 kcal/kg/day
- Avoid overfeeding while meeting basal requirements

MACRONUTRIENT NEEDS

- Protein: 10-30%; 0.8g/kg/day (1.5 g/kg/day under stress)
- Fat: 20-35% of total energy intake with reduced
  - Cholesterol
  - Saturated fats
  - Trans fatty acids
- Carbohydrates: 45-65% of total energy intake — complex carbohydrates as preferred source
- Fiber: 30 g/day men; 21 g/day women
- Fluid Needs: 30ml/kg of body weight/day

What Does the Pyramid Mean?

- 8 ounce glasses of fluid
- Watch sodium content
- Whole grain fibers
- Note fiber icon in every section
- 6 or more servings
- Leafy greens, orange and yellow vegetables, and colorful fruit: Rich in Vitamin A & C and Folic Acid—3 servings

More on Food Pyramid

- Deep colored fruit: Frozen, fresh, dried, or canned — 2 or more servings
- 100% fruit juice
- Dry beans, nuts, fish, poultry, lean meat, and eggs—2 or more servings
- Low and nonfat dairy products—3 or more servings
- Use saturated fats, sugar, & salt sparingly!!
**Fluid Needs**
- Decreased perception of thirst is normal
- Decreased response to serum osmolality
- Reduced ability to concentrate urine
- 30 ml/kg/day or 1 ml/kcal ingested

**Dehydration**
- Most common fluid or electrolyte disturbance in older adults
- Common signs of dehydration
  - Decreased urine output
  - Constipation
  - Mucosal dryness
  - Confusion

**Question 2**
The daughter of an 86 year old woman wants to discuss her mother’s weight loss. The mother had always been moderately obese, but she has steadily lost >10% of her weight over the last 6 months. The patient lives in a dementia-care unit and has slowly progressive, mild to moderate stage dementia.
ARS Question 2
Which of the following is the best response regarding weight loss in an older adult living in an institutional setting?

1. Unintended weight loss in an obese adult often improves outcomes
2. Unintended weight loss requires evaluation
3. The patient should be given protein supplements
4. Weight Loss in older adults is normal

Question 3
• A 90-year-old man comes to the office for follow-up.
• History includes atrial fibrillation, heart failure (ejection fraction of 35%), type 2 diabetes mellitus controlled by diet, and hypertension. Medications include atenolol, digoxin, lisinopril, and warfarin.
• He was the primary caregiver for his wife, who had dementia and died recently. The patient states that he is somewhat fatigued and has a poor appetite but does not feel depressed or sad.

Question 3, Continued
• He has had some dizziness and occasional nausea and diarrhea with incontinence but no melena or hematochezia. He has had no falls. There are no symptoms of polyuria or polydipsia. He has a distant smoking history and worked in the printing industry. He lives in a senior retirement community.
• On examination, blood pressure is 110/60 mmHg and heart rate is 58 beats per minute. He has lost 8.2 kg (18 lb) (9% of his body weight) since his last visit 6 months ago. His affect seems fatigued and flat.

ARS Question 3
Which of the following is the best next step?

1. Colonoscopy
2. Administration of Geriatric Depression Scale
3. High-resolution CT of the chest
4. Home visit
5. Measurement of serum digoxin level

**Anthropometrics**
- Includes measure of weight and height
  - Body Mass Index (BMI) = weight in kg/height in m squared
  - Risk threshold for low BMI = 18.5
  - Weight loss of 5% in 1 month or 10% in 6 months indicates nutritional risk and morbidity and predicts:
    - Functional limitations
    - Health care charges
    - Need for hospitalization
    - MDS-3 uses the above criteria by Medicare in SNF

**Nutritional Intake**
- Inadequate intake defined as average intake of food groups, nutrients, or energy 25-50% below a threshold level of the RDA
- Minimum data set uses intake of <75% of food provided triggers nutritional assessment in nursing homes
- 5-18% of NH residents do not meet standards for adequate nutritional intake
**Albumin**
- Risk factor for morbidity and mortality
- Lacks sensitivity and specificity for malnutrition
- Prognostic value of low albumin (<3.5) is probable marker for injury, disease, or inflammation
- In community associated with:
  - Functional limitations
  - Sarcopenia
  - Increased health care use
  - Mortality
- In Hospital
  - Increased length of stay
  - Complications
  - Readmissions
  - Mortality

**Prealbumin**
- Reflects short-term changes in protein status
- Albumin half-life: 18-20 days
- Prealbumin half-life: 48 hours
- Can be used to assess effectiveness of interventions
- Can be used as indicator of recovery
- More effective if inflammation is not present

**Cholesterol**
- Acquired hypocholesterolemia (<160) is a nonspecific feature of poor health status that is independent of nutrient or energy status
- May reflect a pro-inflammatory condition
- Often detected in serious underlying disease
- Community-dwelling older adults with both low albumin and low cholesterol have higher rates of morbidity and mortality than those with either low albumin or low cholesterol alone

**Drug-Nutrient Interactions**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Reduced Nutrient Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Zinc, Vitamins A, B1, B2, B6, B12, Folate</td>
</tr>
<tr>
<td>Antacids</td>
<td>Vitamin B12, Folate, Iron</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Vitamin K</td>
</tr>
<tr>
<td>Colchicine</td>
<td>Vitamin B12</td>
</tr>
<tr>
<td>Digoxin</td>
<td>Zinc</td>
</tr>
<tr>
<td>Diuretics</td>
<td>Zinc, Magnesium, Vitamin B6, Potassium, Copper</td>
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<tr>
<td>Isoniazid</td>
<td>Vitamin B6, Niacin</td>
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<tr>
<td>Levodopa</td>
<td>Vitamin B6</td>
</tr>
<tr>
<td>Laxatives</td>
<td>Calcium, Vitamins A, B2, B12, D, E, K</td>
</tr>
</tbody>
</table>

**More Interactions**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Reduced Nutrient Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipid-Binding Resins</td>
<td>Vitamins A, D, E, K</td>
</tr>
<tr>
<td>Metformin</td>
<td>Vitamin B12, Total Kcal</td>
</tr>
<tr>
<td>Mineral Oil</td>
<td>Vitamins A, D, E, K</td>
</tr>
<tr>
<td>Phenytoin</td>
<td>Vitamin D, Folate</td>
</tr>
<tr>
<td>Salicylates</td>
<td>Vitamin C, Folate</td>
</tr>
<tr>
<td>SSRIs</td>
<td>Total Kcal (via anorexia)</td>
</tr>
<tr>
<td>Theophylline</td>
<td>Total Kcal (via anorexia)</td>
</tr>
<tr>
<td>Trimethoprim</td>
<td>Folate</td>
</tr>
</tbody>
</table>

**Malnutrition Risk Factors**
- Alcohol or Substance Abuse
- Cognitive Dysfunction
- Decreased Exercise
- Depression
- Functional Limitations
- Inadequate Funds
- Limited Education
- Limited Mobility & Transportation
- Chronic Diseases
- Medications
- Poor Dentition
**Nutrition Tools**
- Nutritional Screening Initiative
- Determine checklist
- Level I and II
- Identify risks not to diagnose
- Not validated
- Mini Nutritional Assessment (MNA)
  - Uses 18 items to assess risk
  - Only validated for over age 65
- Use Mini Nutritional Assessment Short Form
  - Good for screening
  - Uses 6 items

**Determine Checklist**
- Disease
- Eating Poorly
- Tooth Loss, Mouth Pain
- Economic Hardship
- Reduced Social Contact
- Multiple Medicines
- Involuntary Weight Loss or Gain
- Need for Assistance in Self Care
- Elderly (Age > 80)

**DETERMINE Background**
- Developed by AAFP, ADA, and NCOA
- Self-report questionnaire
- Screening instrument
- NOT Diagnostic
- Scoring
  - 0-2: Good
  - 3-5: Moderate Nutritional Risk
  - 6 or More: High Nutritional Risk
- Use for health care professionals for further assessment

**Mini Nutritional Assessment**
- Parts A-F is used for screening
- Score 12 or > not at risk
- Parts G-R used for assessment
- Total Score > 23.5 normal
- Total Score < 23.5 at risk
- No laboratory needed
NUTRITIONAL SYNDROMES

Anorexia of Aging
Feeding Problems
Swallowing Problems
Obesity
Involuntary Weight Loss

MNA iPhone App

- Sponsored by Nestles: No Advertisement
- Options
  - New Screening
  - Previous Screening
  - Follow-up Screening
  - Personal Settings
  - E-mail Feedback
- Name
- Gender
- Date of Birth
- Setting: Clinic, home, hospital, nursing home
- Uses MNA screening 6 items

Question 4

- 88 y/o man is brought to the ED by his son because for the past 3 days he has had progressively worsening confusion and gait ataxia.
- The son states his father was well until 2 years ago, when he was hit by a car while riding his bicycle and suffered multiple compound fractures. He has been hospitalized several times since for recurrent osteomyelitis and weight loss. His last hospitalization was 3 months ago for pseudomembranous colitis. The patient had remained cognitively intact and functionally independent until 3 days ago. He does not smoke or drink alcohol
- The patient remained cognitively intact and functionally independent until 3 days ago
Question 4, Continued

- Meds are mirtazapine for depression, bismuth subsalicylate and atropine/diphenoxylate as needed.
- He appears cachectic and is disoriented. Weight is 130 lbs., temp = 35.5, BP = 122/76, RR = 15, and pulse = 90. On standing BP = 113/69 and pulse = 98. Neuro exam shows nystagmus, symmetric motor tone without weakness, diminished reflexes, bilateral flexor plantar responses, and wide based gait.
- CT of head is unremarkable
- Hgb = 11.8, WBC = 5200
- BMP is normal

ARS Question 4
Which of the following is the best NEXT Step?
1. Obtain CT with contrast of the head, chest, abd & pelvis
2. Obtain blood cultures & start IV antibiotics
3. Start haloperidol
4. Start IV thiamine
5. Stop all meds, rehydrate IV with normal saline and 5% glucose and reassess in 24-48 hours.

Anorexia of Aging

- Food intake is motivated between internal signals and environmental cues
- Olfaction
- Taste: Increase in taste threshold
- Vision
- Hearing
- Sense of smell dramatically decreases
- Earlier Satiation: Less antral distension

Feeding Problems

- Loss of functional ability to eat
- Decayed or missing teeth
- Ill-fitting dentures
- Dry mouth from medications
- Edentulous: Fresh fruits, vegetables, & high fiber foods
- Limitations in self-feeding:
  - Tremors
  - Vision Loss
  - Sedation
  - Memory Loss
  - Arthritis

Swallowing Problems

- 16-22% in adults > 50 y/o
- Up to 60% in NH
- Upper esophageal sphincter function and peristalsis can result in dysphagia

Obesity

- BMI > 30
- 14% in 1976 to 32% in 2004
- Associated with Hypertension, Diabetes Mellitus, Cardiovascular Disease, and Osteoarthritis

Adverse Outcomes
- Impaired Functional Status
- Increased Healthcare Resource Use
- Increased Mortality
- Prevalence has increased in all age groups
Treatment of Obesity

- Diet
- Behavior modification
- Exercise
- For frail, obese older adults, emphasize prevention of strength and flexibility rather than weight reduction

Effect of Obesity

- Longitudinal population-based survey
- 10,755 respondents > 65 y/o
- Falls, injuries, & increased disability within 2 years
- Three Classes of Obesity
  - BMI 30.0-34.9
  - BMI 35.0-39.9
  - BMI > 40.0
- Underweight was not associated with above
- Obesity associated with > risk of falling and > risk of greater ADL disability

Villareal D. Weight Loss, Exercise, Or Both and Physical Function in Obese Older Adults. NEJM March 31, 2011. 364:1218-1229.

Involuntary Weight Loss

- Loss of 10 lbs. or >5% of usual body weight
- >10% loss represents protein-energy malnutrition
- >20% loss represents impaired physiologic function
- BMI <17 consistent with under-nutrition
- 13% of older OP, 25-50% hospitalized, & >50% in NH
- Etiology
  - 50% Organ: CHF, COPD, RF, Chronic Inflammation, Meds
  - 20%: Neoplastic
  - 20%: Idiopathic
  - 10%: Psychosocial Conditions

Preventing Under Nutrition

- Cater to patient’s food preference
- Avoid restrictive “therapeutic diets” unless value is real
- Enhance patient’s preparedness for meal
- Enhance comfort, taste, appearance of food
- Enhance social aspect
- Provide adequate time
- Address oral/dental complaints

NUTRITIONAL INTERVENTIONS

Oral Nutrition & Supplements
Drug Treatment
Culturally Appropriate
Legal and Ethical Issues
Dietary Supplements
- Often decrease food intake, but overall nutritional intake increased due to nutrient quality & supplement density
- Contain macro- and micronutrients
- Available in liquid and bar forms
- Most formulas provide 1-1.5 calories/ml
- Many are lactose and gluten free

Micronutrients
- Vitamin D deficiency occurs in 30% of patients >70
- Impaired calcium absorption and reduced activity
- Safely supplement up to 4000 IU per day
- Repletion of Vitamin D
  - Improved physical performance
  - Reduced falls
  - Improved bone healing
  - Response to bisphosphonates
- Folic Acid, Vitamin B6 & B12 lower homocysteine
- β Carotene, Vitamin A, Vitamin E increase mortality
- Vitamin E does not slow Alzheimer's

Drug Treatment
- Mirtazapine 7.5-30 mgm qhs
  - Caution with renal or hepatic insufficiency
- Cyproheptadine 2-4 mgm with meals
  - Potential for confusion in older adults
- Megestrol 320-800 mg/day in 2 divided doses
  - Weight gain is primarily fat
  - DVT
  - Fluid retention
  - Edema
  - CHF
- Dronabinol 2.5 mg BID
  - Somnolence and dysphoria

Culturally Appropriate
- Minority Older: 16% in 1999 to 25% in 2030
- Ethnic and religious customs influence food preferences
- Latinos: Disease as destiny & fear effects of meds
  - Hot and cold theory of disease
- Many culturally appropriate education materials: http://hnrca.tufts.edu/my-plate-for-older-adults/

RX Swallowing Problems
- Speech Path evaluation
- Modified Barium swallow
- Positioning & food consistency
- Sitting straight up and chin down
- Thin Fluids: Coordinated & control
- Thickened food
- Commercial thickeners

Legal Issues
- Omnibus Budget Reconciliation Act of 1987
  - Any loss > 5% in the past month
  - >10% in the past 6 months
- Minimum Data Set: Intake of <75% of food provided triggers nutritional assessment
- Food & fluids offered to all patients
- Decision to start or discontinue artificial nutrition or hydration must be considered very carefully
  - Competent adults have rights
SUMMARY

Summary

- Beware of weight loss of > 5% in past month or > 10% in past 6 months:
  - Functional Limitations
  - Health Care Charges
  - Need for Hospitalization
- In NH Minimum Data Set: Intake of < 75% of food provided triggers nutritional assessment
- Many laboratory parameters
- Screening Tools
  - Determine checklist
  - Mini Nutritional Assessment Short Form
  - Download MNA from App store

Resources

- My Pyramid has evolved into My Plate
- Obesity is a form of malnutrition
- Remember mealtime is a social event!
- Medication treatment can be an option
- Feeding & swallowing problems are common in nursing home – Do an oral exam
- Do not forget cultural background of patient
- Remember your legal obligations

Resources

  - Chapter 28, Nutrition and Weight, Updated June 2015
  - Chapter 29, Eating and Feeding Problems, Updated June 2015
- GRS Teaching Slides, Eighth Edition
  - Malnutrition
  - Eating and Feeding Problems

Resources

The following medications were discussed in this presentation. The table below lists the generic and trade name(s) of these medications.

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atenolol</td>
<td>Tenormin</td>
</tr>
<tr>
<td>Atropine/Diphenoxylate</td>
<td>Lomotil, Lonox, Motofen</td>
</tr>
<tr>
<td>Bismuth Subsalicylate</td>
<td>Pepto Bismol</td>
</tr>
<tr>
<td>Colchicine</td>
<td>Colcrys, Mitigare</td>
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<tr>
<td>Cyproheptadine</td>
<td>None</td>
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<tr>
<td>Digoxin</td>
<td>Lanoxin</td>
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<tr>
<td>Dronabinol</td>
<td>Marinol</td>
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<tr>
<td>Haloperidol</td>
<td>Haldol</td>
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<td>Isoniazid</td>
<td>Laniazid</td>
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<td>IV Thiamine</td>
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<td>Levodopa</td>
<td>None</td>
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<tr>
<td>Lisinopril</td>
<td>Prinivil, Zestril</td>
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<td>Megstrol</td>
<td>Megace</td>
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<tr>
<td>Metformin</td>
<td>Fortamet, Glucophage, Glumetza, Riomet</td>
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<td>Mirtazapine</td>
<td>Remeron</td>
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<tr>
<td>Phenytoin</td>
<td>Dilantin, Phenytek</td>
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<td>Theophylline</td>
<td>Elixophyllin, Theo-24, Theochron, Uniphyl</td>
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<tr>
<td>Trimethoprim</td>
<td>Primsol</td>
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<tr>
<td>Warfarin</td>
<td>Coumadin, Jantoven</td>
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