NUTRITION IN GI DISORDERS

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DISCLOSURE

• I have no relevant financial or nonfinancial relationships to disclose
OBJECTIVES

• Discuss nutrition and types of assessment tools
• Discuss nutrition in multiple gastrointestinal disorders and review evidence-guided therapies
INTRODUCTION

• In lean healthy people, death associated with weight loss >35%, protein storage loss >30%, and fat storage loss >70%
• Literature detailing nutrition as medical therapy has been controversial
• Overall, there is a lack of large, randomized, prospective studies comparing one nutritional therapy with another
• Thus, meta-analyses often are used to group small studies and allow reasonable conclusions
NUTRITIONAL ASSESSMENT

- Medical History and Physical Exam
  - Inquiry into patient’s usual body weight (UBW) vs ideal body weight (IBW) or present body weight (PBW)
    - Predictors of morbidity and mortality in studies
    - Percentage deviation from UBW over last 3-6 months most sensitive marker of nutritional risk
NUTRITIONAL ASSESSMENT

• Anthropomorphic Measurements
  • Estimation of body composition or body stores of using relatively simple and inexpensive equipment such as hand-held calipers and scales
    • Triceps skinfold (TSF): a marker of body fat stores, and mid-arm muscle circumference (MAMC)
  • Body Mass Index (BMI)
    • (Weight in kg)/(height in meters)²
NUTRITIONAL ASSESSMENT

• Biochemical Measurements
  • Plasma proteins: albumin, prealbumin, and transferrin
    • Albumin poor indicator of protein malnutrition
      • Half-life 21 days
      • Infections, medications, liver disease, and acute physiologic changes affect levels
    • Prealbumin better marker of nutritional status
      • Half-life 2 days
NUTRITIONAL ASSESSMENT

• Immunologic tests
  • Serum total lymphocyte count not study validated

• Muscle Function
  • Hand grip strength measures forearm lean muscle mass
    • Not reliable for acutely ill or patients with hand or arm motor abnormalities
NUTRITIONAL ASSESSMENT

• Global Assessments
  • No single tool that is an accurate predictor of nutritional status to date
  • Subjective Global Assessment (SGA)
    • Incorporates weight changes, dietary intake, functional capacity and preliminary medical diagnosis
    • Validated in oncology population
NUTRITIONAL ASSESSMENT

• Caloric Assessment
  • Mathematical equations
    • Harris-Benedict equation
      • Men: Energy needs (kcal/24hr) = 66 + (13.7xW)(5xL) - (6.8xA)
      • Women: Energy needs (kcal/24hr) = 655 + (9.6xW) + (1.7xL) - (4.7xA)
    • Indirect Calorimetry by heat produced by oxidation

• Protein Assessment
  • Measured by calculation with assessing 24-hour urine urea nitrogen (UUN)
NUTRIENT SUBSTRATES

- Macronutrients
  - Carbohydrates
  - Fats
  - Proteins
- Macrominerals
  - Calcium
  - Phosphorus
  - Magnesium
NUTRIENT SUBSTRATES

• Micronutrients
  • Chromium
  • Copper
  • Iodine
  • Iron
  • Manganese
  • Selenium
  • Zinc
NUTRIENT SUBSTRATES

- Vitamins
  - Water-Soluble
    - Vitamin C
    - Thiamine (Vitamin B1)
    - Riboflavin
    - Niacin
    - Pantothenic Acid
    - Biotin
    - Folic Acid
    - Vitamin B12
    - Vitamin B6 (Pyridoxine)
NUTRIENT SUBSTRATES

• Vitamins
  • Fat-Soluble
    • Vitamin A
    • Vitamin D
    • Vitamin E
    • Vitamin K
NUTRITION IN SPECIFIC DISEASE STATES

• Intestinal Failure (Short Bowel Syndrome)
  • Results in loss or disease of the intestine, or both, that precludes adequate digestion and absorption
  • Crohn’s disease, intestinal trauma, and intestinal infarction are most common causes
  • Nutritional management of short bowel syndrome depends on the amount and location of small bowel removed
  • Intestinal rehab more successful if colon and ileocecal valve preserved
NUTRITION IN SPECIFIC DISEASE STATES

- Intestinal Failure (Short Bowel Syndrome)
  - Proton pump inhibitors used to reduce gastric hypersecretion
  - Anticholinergics used to slow intestinal transit
  - Parenteral nutrition (PN) used to meet nutritional needs
  - Oral feeding gradually started while volume of PN reduced
  - Cholestyramine can be used for bile salt-induced diarrhea with partial ileal resection and preserved colon
  - Vitamin B12 given monthly
  - Trial of small-peptide, low-fat, enteral formula for significant small bowel resections (80-100 cm remaining)
  - PN-dependency for <80 cm small bowel remaining and no colon
  - Somatostatin to reduce intestinal secretions and slow transit time remains controversial
  - Use of growth hormone, glutamin, and a rice-based diet to cause small bowel mucosal hypertrophy and better absorption is controversial
  - Glycoprotein (GL-2) postulated as a small intestine mucosal stimulator for improved absorption
NUTRITION IN SPECIFIC DISEASE STATES

- Pancreatitis
  - Nutritional support imperative for severe pancreatitis and relapsing chronic pancreatitis
  - Early enteral nutrition (EN) reduces complications and mortality than NPO regimen
  - PN associated with central line catheter sepsis and hyperglycemia
  - Intrajejunal feedings safe and well tolerated
    - Standard, fat-containing, polymeric enteral formula can be used
  - Gastric feedings have been used successfully in severe acute pancreatitis but still topic of investigation
• Crohn’s Disease
  • Pts often hypermetabolic
  • Anorexia possibly present due to nausea and abdominal pain
  • Deficiencies of magnesium, selenium, potassium, and zinc common due to diarrhea and possible fistula tracts
  • Dietary therapy important but no specific diet can be recommended
    • Fat restriction may be important with ileal disease and hx of ileal resection
    • EN may be important for those who cannot eat
    • EN not superior to PN for inducing remission, though less costly and fewer complications
    • PN restricted for pts failing conservative medical therapy (EN and medications), or in pts EN cannot be delivered
Liver Disease

- Nutritional deficiencies common due decreased dietary intake, altered metabolism, decreased nutrient storage, and increased nutrient requirements
- Decreased dietary intake more common in cirrhosis
- Decreased bile salt production results in intolerance to high-fat food and fat-soluble vitamin malabsorption
- Hypoalbuminemia results in edema of small bowel mucosa leading to poor nutrient absorption
- Depletion of muscle mass due to lack of glucose stores and dependency on protein stores for energy
  - Rise in aromatic amino acids, thought possibly making hepatic encephalopathy worse
- Limiting protein intake not recommended
- PN should be used with caution due to immune dysfunction places pts at risk for catheter related sepsis
- Nutritional support beneficial for patients prior to liver transplantation
NUTRITION IN SPECIFIC DISEASE STATES

• Diverticular Disease
  • No clinical data to avoid nuts or foods with seeds
  • Data suggests high-fiber diet will reduce occurrence of symptomatic disease
    • Fiber intake should be at least 25 g/day, as insoluble fiber such as wheat bran, bran muffins, and fiber-based cereals
  • Probiotics with some success with treatment and prevention of diverticulitis
NUTRITION IN SPECIFIC DISEASE STATES

• Dumping Syndrome
  • Common after partial gastrectomy and vagotomy
  • Hypertonic gastric contents empty rapidly into the small intestine, and consequently 25% of the plasma volume is transferred to small intestine
  • Symptoms of nausea, cramping, diaphoresis, and palpitations
  • Nutritional therapy
    • Lower osmolarity solution to the small intestine by frequent ingestion of small meals containing fat, protein, and complex carbohydrates, limited in simple sugars
    • Fluid intake restricted and separate from solid food intake to avoid rapid gastric transit
Celiac Disease

- Small intestinal injury resulting in malabsorption caused by gluten-containing foods, such as wheat, barley, rye, or oats.
- Classic signs of malabsorption, especially in younger pts:
  - Diarrhea, cramping, marked weight loss, and often folate, iron, and fat-soluble vitamin deficiencies.
- Treatment is gluten-free diet:
  - Wheat starch free of gliadin is basis of gluten-free breads.
  - Corn, rice, and buckwheat allowed.
  - Most patients improve with dietary management, IF, compliant.
NUTRITION IN SPECIFIC DISEASE STATES

- **Cancer**
  - Protein calorie malnutrition common
  - Cancer cachexia induced by tumor through multiple metabolic abnormalities
  - Appetite stimulation effective in mild malnutrition
  - Routine use of aggressive nutritional support in pts receiving chemotherapy and radiation is controversial
  - PN beneficial for pts w/ gastrointestinal obstruction from primary or metastatic tumors
  - EN effective for pts w/ head and neck cancer to prevent weight loss, reduce hospitalizations, and reduce interruptions in chemotherapy and radiotherapy
  - In summary, nutritional support in the cancer pt should be restricted to those with a reasonable life expectancy
NUTRITION IN SPECIFIC DISEASE STATES

- Obesity
  - GI doc traditionally involved in post-bariatric surgical complications, including stomal stenosis, gastrointestinal bleeding, and fistulization
  - Obesity-related GI disease staple of practice, such as GERD

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<th>TREATMENT</th>
<th>Body Mass Index (kg/m²)</th>
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NUTRITION IN SPECIFIC DISEASE STATES

- Obesity
  - Surgical management in the United States:
    - Roux-en-Y gastric bypass
    - Vertical banded gastroplasty
    - Gastric banding
    - Most weight lost in first year
    - Mortality 0.5-2%
  - Endoscopic management in United States:
    - Gastric balloon (Orbera, ReShape, Obalon)
Irritable Bowel Syndrome
- High fiber diet is of global benefit with NNT of 11
  - Fiber supplements better tolerated than dietary fiber
  - Wheat bran no better than placebo
  - Fiber not helpful for pain, but beneficial for constipation and firming up loose stools
  - Gradual increase of supplemental fiber to 10-15 g

Food intolerance
- Lactose intolerance possible but usually symptoms persist despite elimination
- Fructose consumption
- Reducing fatty foods, gas-producing foods, caffeine, or alcohol may be helpful but no randomized controlled studies

Elimination diets can be useful in some cases
- Systematic review shows 12-67% of patients with IBS will respond but most data uncontrolled

FODMAP diet
NUTRITION IN SPECIFIC DISEASE STATES

- Colorectal Cancer Risk
  - High fiber diet: may decrease
  - High intake of fruits and vegetables: unclear
  - Obesity: increases
  - Cigarette smoking: increases
  - Fish: decreases
  - Garlic: moderately decreases
  - Meat: red and processed meats increase risk
  - High folate intake: increases with caveats
  - Alcohol: increases with >30 g/day
  - Exercise: decreases
  - Mediterranean diet: probably decreases
REFERENCES


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