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

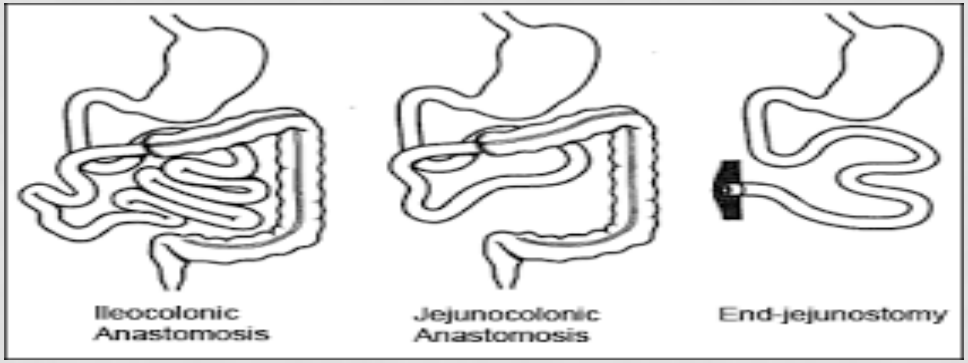
- Vitamins
  - Water-Soluble
    - Vitamin C
    - Thiamine (Vitamin B1)
    - Riboflavin
    - Niacin
    - Pantothenic Acid
    - Biotin
    - Folic Acid
    - Vitamin B12
    - Vitamin B6 (Pyridoxine)

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



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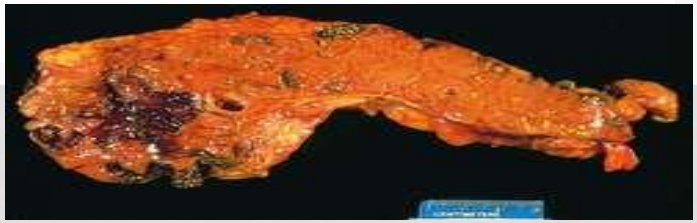
NUTRITION IN SPECIFIC DISEASE STATES

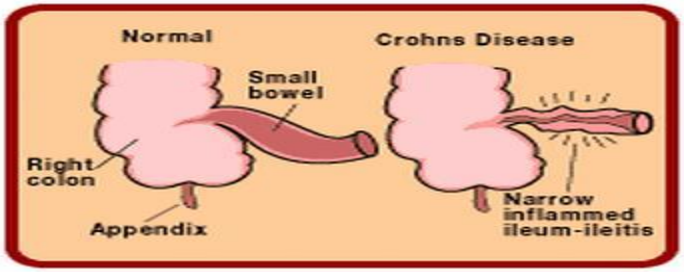
- Intestinal Failure (Short Bowel Syndrome)
  - Proton pump inhibitors used to reduce gastric hypersecretion
  - Anticholinergics used to slow intestinal transit
  - Parenteral nutrition (PN) used to meet nutritional needs
  - Oral feeding gradually started while volume of PN reduced
  - Cholestyramine 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

NUTRITION IN SPECIFIC DISEASE STATES



- 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

NUTRITION IN SPECIFIC DISEASE STATES

- 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

NUTRITION IN SPECIFIC DISEASE STATES

- 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

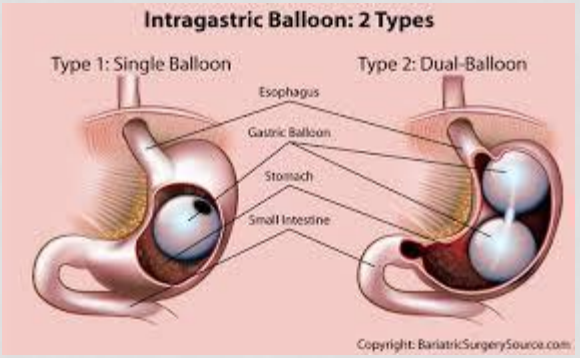
NUTRITION IN SPECIFIC DISEASE STATES

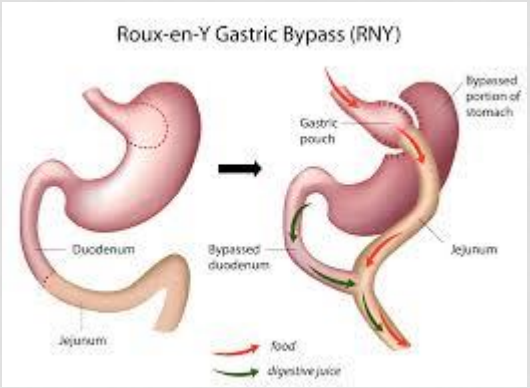
- Obesity
  - GI doc traditionally involved in post-bariatric surgical complications, including stomal stenosis, gastrointestinal bleeding, and fistulization
  - Obesity-related GI disease staple of practice, such as GERD

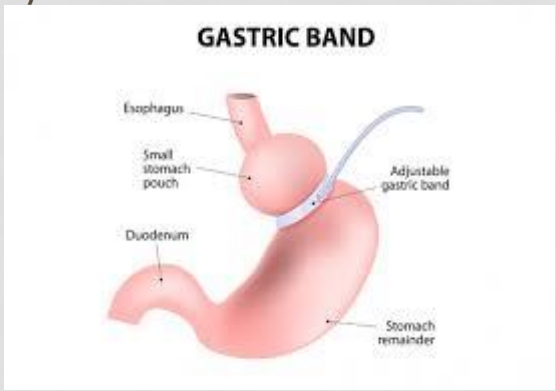
		Body Mass Index (kg/m2)			
TREATMENT	25-26.9	27-29.9	30-34.9	35-39.9	>40
Diet, physical activity, behavior therapy	With comorbidity	With comorbidity	Yes	Yes	Yes
Pharmotherapy	No	With comorbidity	Yes	Yes	Yes
Surgery	No	No	No	With comorbidity	Yes

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)







NUTRITION IN SPECIFIC DISEASE STATES

- 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

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