

Nutritional Challenges After Surgery



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Objectives



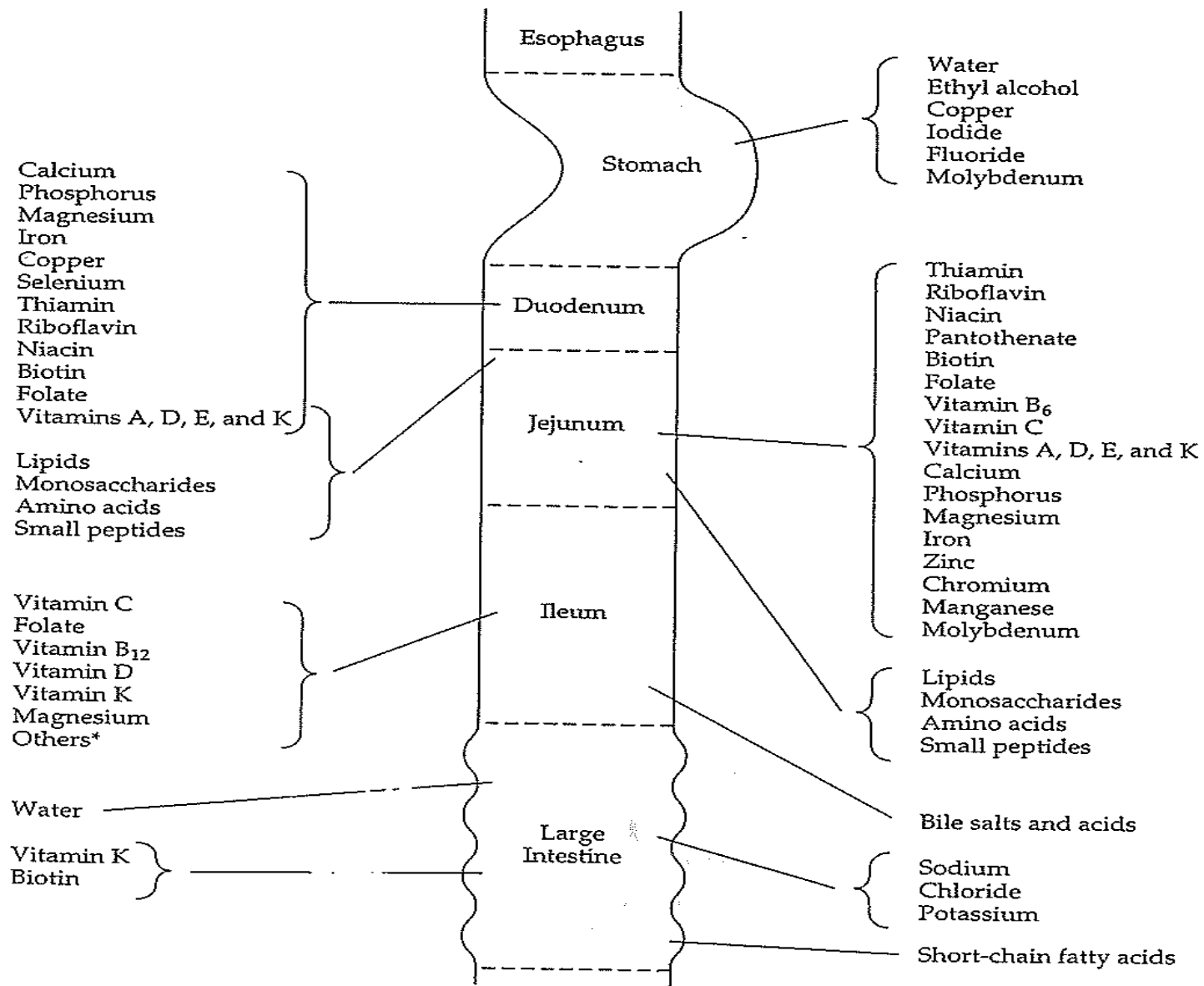
- Identify the reasons that GIST and its treatment impacts nutrition status
- Identify the nutrient deficiencies for which GIST patients are at risk
- Understand the nutritional monitoring and treatment to prevent nutritional deficiencies

Statistics



- Gastrointestinal Stromal Tumors (GIST) can occur anywhere in the gastrointestinal (GI) tract from esophagus to the anus
- 50-70% occur in the stomach
- 20-30% occur in the small intestines (duodenum, jejunum or ileum)
- These are the areas where the majority of digestion and absorption take place

THE DIGESTIVE SYSTEM: MECHANISM FOR NOURISHING THE BODY



*Many additional nutrients may be absorbed from the ileum depending on transit time.

Nutritional Symptoms of GIST



- Abdominal discomfort/pain
- Nausea/Vomiting
- Early Satiety (feeling of fullness after eating small amounts of food)
- Loss of appetite
- Swallowing problems
- Unexplained weight loss
- Blood in the intestinal tract
- Fatigue

Nutritional Impact of Work Up



- No eating (NPO) before tests
- Taking barium for tests that causes nausea, diarrhea, constipation and a bad taste in the mouth
- Stress affects on appetite
- Change in lifestyle patterns impact on meal times, frequency and healthy food choices
- Inability to consume adequate liquids
- Inability to exercise
- Depression

Nutritional Impact of Treatment



Targeted Therapy

- May be used before surgery to shrink the tumor so it is more easily removed or after surgery to reduce the risk of recurrence (adjuvant therapy)
- Imatinib (Gleevec®): stomach upset, diarrhea
- Sunitinib (Sutent®): diarrhea, mouth irritation, increased risk of bleeding (including the GI tract)

Nutritional Impact of Treatment



Radiation Therapy

- Not frequently used in GIST for treatment but may be used for symptom management
- Nutritional side effects can include nausea, vomiting, diarrhea, fatigue.

Nutritional Impact of Surgery



- Surgery is the primary treatment mode for GIST with the goal of complete removal
- Depending on size and location of the tumor(s) surgery may require the partial or complete removal of the stomach, sections of the intestine and sometimes sections of surrounding organs such as the liver
- While the GI tract is very adaptive surgery will impact the ability to absorb and utilize the nutrients that are consumed.

Nutritional Impact of Surgery



Gastrectomy

- Dumping Syndrome
- Reflux
- Loss of acid production
 - Affects absorption of iron
- Loss of intrinsic factor production
 - Affects absorption of B12
- Absorption of other micronutrients
 - Copper

Nutritional Impact of a Gastrectomy



Dumping Syndrome

- Nutrients move too quickly through the GI tract
- Symptoms include cramping, bloating, nausea, dizziness, diarrhea within 60 minutes of eating
- Latent dumping syndrome a drop in blood glucose level
- Caused by too concentrated or too much volume of food at one time.
- Pancreatic exocrine insufficiency may be a cause
- Causes malabsorption of vital nutrients
- Treatment: Small frequent meals, limited liquids at meals, avoid very sugary foods, greasy foods

Nutritional Impact of a Gastrectomy



B12 (cyanocobalamin)

- The most common deficiency after GI surgery
- Requires intrinsic factor to be absorbed so any patient who has a total gastrectomy will require B12 replacement and monitoring for the rest of their life
- Patient who have a partial gastrectomy or bowel resection that decreased contact in the ileum may require supplementation or replacement
- RDA 2.4 micrograms (mcg) per day. Most people eat 3.5-5 mcg through legumes, animal origin foods, and cereals
- Replacement 350 mcg oral daily, 500 mcg SL, 1000 mcg IM every 3 months, 500 mcg IN weekly

Nutritional Impact of a Gastrectomy



Reflux

- Frequent side effect of a partial gastrectomy or esophagogastrectomy where the upper flap over the stomach is removed
- Also can occur as a result of overeating or with delayed emptying of the stomach
- Treatment: Small frequent low fat meals. Sit up at meal times and for at least one hour afterwards. Stop eating at least 2 hours before bed time.
- Medication: Acid blocking medication can affect the absorption of iron, calcium and B12

Nutritional Impact of a Gastrectomy



Copper (ceruloplasmin)

- Exact mechanism of deficiency is unknown but has been documented
- Because of its role in protein and iron metabolism symptoms of deficiency include microcytic anemia, and peripheral neuropathy
- Low serum levels are indicative of deficiency
- Diet sources: shell fish are high but copper is found in grains, dark greens, organ meats, nuts
- Recommended intake: 2-4 mg/day for replacement and 900 mcg/day for maintenance

Nutritional Impact of Gastrectomy



Pancreatic Insufficiency

- Fat malabsorption (steatorrhea) is common after a total gastrectomy and not common but possible after a partial gastrectomy
- Usually manifests within a couple of months of surgery
- Characterized by white, frothy, floaty, pungent smelling stools
- Requires oral pancreatic enzyme replacement at the all feedings to be corrected.

Nutritional Impact of Small Bowel Surgery



Small Bowel Resection

- The majority of digestion and absorption take place in the duodenum and the jejunum
- The more radical the surgery, the more profound the nutritional impact
- Surgeries that shorten the jejunum reduce the absorptive surface. Common concerns are the B vitamins including thiamin and folic acid.
- Surgeries that affect the duodenum will impact nutrients that require bile acids or an alkaline environment to be absorbed like fat soluble vitamins A, E, D and K, carnitine, calcium, phosphorus and selenium

Nutritional Impact of Small Bowel Surgery



Thiamin (B1)

- Absorbed in the jejunum and ileum
- Because it is a high turnover nutrient deficiency (Beriberi) characterized by neurological symptoms, hypotension, hypothermia, tongue redness can be seen in as little as 18 days
- Vomiting and diarrhea increase poor absorption
- All patients with resection of the jejunum/ileum will benefit from supplementation. RDA 1.2 mg daily but may require 50-100 mg orally for replacement. Thiamin is very available in fortified grains, organ meats and yeast.
- Replacement is typically done IV/IM

Nutritional Impact of Small Bowel Surgery



Folic Acid (folate, folacin)

- Present in almost all foods.
- Though absorption takes place by several mechanisms, when deficiency is seen in GIST it is most frequently related to small bowel surgery such as Roux-en-Y bypass or short bowel . Because absorption is dependent on B12 their deficiency is often associated.
- Symptoms of deficiency include megoblastic anemia, and neuropathy. Serum levels are used to evaluate status.
- Folic acid is available in a large variety of foods and even in malabsorptive conditions a standard multiple vitamin was found to be sufficient to prevent deficiency. 50 -100 mcg/day are need to prevent deficiency.

Nutritional Impact of Small Bowel Surgery



Fat Soluble Vitamins (A, E, D and K)

- Fat soluble vitamin deficiency is rarely seen because the body stores them in their fat cells and liver giving the body several years worth.
- When deficiency is seen it is related to dysfunction of the production, utilization or resorption of bile acids and/or pancreatic enzymes such as fat malabsorption (steatorrhea)
- Vitamins A and D are the most commonly seen fat soluble vitamin deficiencies in the GIST population.
- Vitamin A deficiency will manifest in visual acuity changes like night blindness
- Vitamin D has a functional relationship with calcium. Symptoms of deficiency like neuropathy, muscle cramps, osteomalacia are often linked.
- While the body can make vitamin D in the skin with exposure to sun light, often patient on Targeted Therapy are photosensitive and can not sit in the sun for 15-30 minutes a day.

Nutritional Impact of Small Bowel Surgery



Calcium

- Needs an acid environment for absorption so after a gastrectomy or on chronic acid blocking medication blood calcium levels should be part of annual blood.
- Very important nutrient in muscle contraction (including the heart) and bone metabolism
- Dairy is the best dietary source but can also be found in food in cruciferous vegetables and small fish where you eat the bones
- Vitamin C or high vitamin C beverages (citrus) improve the absorption in the intestines
- Calcium citrate is better absorbed than the gluconate or carbonate form. 1000-1200 mg/day from diet or supplementation

Nutritional Impact of Large Bowel Surgery



Large Bowel

- Water and electrolytes are absorbed in the colon.
- Significant losses of large bowel can result in diarrhea.
- Diarrhea in excess of 1 liter/day can lead to dehydration, sodium, and potassium deficiencies and zinc deficiency
- Low fiber diet right after surgery if there is a lot of diarrhea but then can transition to a regular diet.

Symptom Management



Diarrhea

- Most common side effect of a bowel resection
- Treatment with medication
- Replace fluids
- Replace electrolytes and zinc if needed
- Evaluate diet and medication for contributing factors

Symptom management



Nausea/Vomiting

- Most common side effect of GIST therapy
- Treatment: medication
- Avoid high aroma foods, greasy foods, spicy foods
- Eat favorite foods when not nauseated so that food aversions do not develop
- Keep well hydrated
- Keep portions small, Do not over eat

Nutrition Care and Monitoring after Surgery



Healthy Diet

- Recommended for all patients after surgery.
- This includes foods from all food groups with 7-11 servings from the fruit and vegetable group using a variety of different colors
- Low fat protein in the form of legumes, meat, poultry, fish, cheese, eggs, nuts, soy, dairy.
- Whole grains in the form of bread, cereals, pastas
- Adequate fluids to maintain hydration
- Moderate alcohol intake

Summary Recommendations



- Healthy diet
- Micronutrient monitoring by your doctor appropriate to your surgery
- Replacement or supplementation of micronutrients when needed
- Be a part of your health care team in managing side effects

Reliable Web Resources



- American Dietetic Association
<http://www.eatright.org>
- American Institute for Cancer Research
<http://www.aicr.org>
- Food and Nutrition Board, Institute of Medicine, National Academy Press.
<http://www.nap.edu>
- Food and Nutrition Information Center, National Agricultural Library, USDA
www.nal.usda.gov/fnic
- National Cancer Institute
www.cancer.gov
- National Center for Complementary and Alternative Medicine, NIH
<http://nccam.nih.gov>
- Office of Dietary Supplements, National Institutes of Health (NIH)
<http://ods.od.nih.gov>

Thank You



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