

Nutrition and Diseases of the Small Intestine

1 . Suppose your institution lists three levels of fat-restricted diets in its diet manual. The low fat diet is set at 25% of total calories. You estimate that your patient needs 2,400 kcal per day.

a. How many grams of fat would you give a patient requiring a moderate fat restriction and the kcal needs are 2,400 kcal?

For a low-fat restriction, $2400 \times 0.25 = 600 \text{ kcal} / 9 \text{ kcal/g} = 66 \text{ g. fat}$

For a moderate-fat restriction, $2400 \times 0.3 = 800 \text{ kcal} / 9 \text{ kcal/g} = 88 \text{ g. fat}$

b. What is the grams of fat generally for a low fat diet for someone with severe steatorrhea?

A low-fat diet is $< 50 \text{ g/d}$.

c. What would be a list of foods a person should limit intake or avoid if they are on a low fat diet?

Beverages made from whole, low fat, & reduced fat milk, biscuits, sweet rolls, muffins, cakes, cookies, avocado in excess of amount allowed in fat list, coconut, tuna/salmon (packed in oil), breaded/fried items, luncheon meat, cheeses, fried potatoes, chips, etc.

2. What nutrients are most likely to be deficient if a patient's diet must be milk-free. For each, give alternative food sources and commonly used supplements. Discuss the ease or difficulty of obtaining sufficient amounts of these nutrients in a milk-free diet.

Calcium (supplements), vit D (supplements or sunlight), and riboflavin (supplements).

Phosphorus, vitamin A (carrots, spinach).

Depending on individual choices, the diet can provide adequate amounts of all essential nutrients. Fortified plant-based beverages (i.e. rice/soy milks) can be substituted for milk.

3. Discuss the appropriateness of making a pt. follow a milk free diet because the pt. is lactose intolerant.

Congenital lactase deficiency is extremely rare & requires life-long lactose-free or very low-lactose diet. Individuals with Secondary Lactose intolerance often require temporary limitation or avoidance of lactose from a few days to several months. Primary (adult lactose deficiency) is the most common of all enzyme deficiencies. If an individual is asymptomatic, no restrictions are indicated . If an individual experiences adverse reactions to lactose, following a lactose-controlled diet is advisable. Commercially available lactose-reduced dairy products are suitable substitutes. A 50% level of lactose reduction may be adequate to relieve signs & symptoms of milk intolerance in the majority of healthy adults with lactose malabsorption.

4. What nutrients might be limiting in the diet if wheat, rye, barley cereals are removed from the diet?

Depending on individual food choices, and adherence to a gluten-free diet, once the villi have regenerated, adequate amounts of most nutrients can usually be obtained from a gluten-free well-balanced diet. Gluten-free cereals tend to be lower in B vitamins and fiber. Care must be taken to ensure adequate intakes of these nutrients.

5. What are the underlying physiological reasons for the different types of diarrhea.

What can an RD do to lessen the symptoms of each type of diarrhea?

Diarrhea is frequent evacuation of liquid stools, accompanied by the excessive loss of fluid & electrolytes. There are four types:

Osmotic - Fixed by fasting - NPO

- Too many osmotically active or nonabsorbable solutes in small intestine.
- Examples & causes:
 - Lactose intolerance
(most can consume 1/2 c at a time.)
Consume milk with meal. Hard cheese - less.
 - Manitol, xylitol, sorbitol over-consumption
 - Milk of Magnesia ---> laxative (too much osmotic material) Mg UL is lower than TDA (synthetic)
 - Bacterial overgrowth

Secretory - Not helped by NPO

- Increased secretion of electrolytes & water by intestinal epithelium
- Due to enteritis or infection caused by virus or bacteria
- Increased motility
Active secretion of fluid from intestinal epithelium because of bacteria or virus. Endotoxin infestation. Body is trying to flush it out. Let it.

Exudative - Leaky Gut.

- Mucosal damage that leads to outpouring of mucus, blood, plasma proteins with net accumulation of electrolytes & water in gut.
- Examples:
 1. Radiation enteritis (damages small intestine)
 2. Chronic ulcerative colitis.

Limited mucosal contact - Combination of the two

- Inadequate exposure of chyme to intestinal epithelium
- Motility disorder
Peristalsis is extreme.
Not enough time to digest.
Body says "Get it out".

Nutritional Care Malabsorption

- Remove cause first
- Manage fluid & electrolytes (w. Kwashiorkor, special cocktail first to replace fluid & electrolytes)
- Finally, nutrients of concern

6. What foods to avoid in someone with gluten sensitive enteropathy to lessen symptoms of the disease?

Breads and baked products containing wheat, rye, barley, oats, etc., cereals, pasta, and noodles made from them, HVP, HPP from ingredients not allowed, battered dipped vegetables, soups made with ingredients not allowed, ice cream/cakes/cookies made from ingredients not allowed, pizza, soy sauce, sauces/gravies, etc.

7. For which disease states or conditions would a person need a low fiber diet and why?

A low-fiber diet is , 10 g/d of fiber. Acute phases of ulcerative colitis, Crohn's disease, & diverticulitis, and when stenosis of the intestines occurs. Diet may be used pre-operatively to minimize fecal volume & residue & post-operatively during progression to a general diet. The reason for a low fiber diet is to reduce the frequency & volume of fecal output while prolonging intestinal transit time, and to prevent blockage of a stenosed GI tract.

8. Why would a pt. need a high fiber diet? What is considered a high fiber diet?

A high feber diet is 20-35 g/d & 2L of water. It is used to increase fecal bulk & promote regularity. To normalize serum lipid levels, to blunt post-prandial blood glucose response. A high fiber diet can be used in the prevention or treatment of various GI, cardiovascular, & metabolic diseases & conditions, including diverticular disease, cancer of the colon, DM, endometrial cancer, constipation, IBS, Crohn's disease, hypercholesterolemia & obesity.

10. What is the appropriate MNT for a person experiencing an inflammatory period for Crohn's disease? What are the MNT guidelines for someone in a non-inflammatory phase of Crohn's disease?

Inflammatory period: low fiber. Maintain fluid & electrolyte balance. Lactose-intolerance is fairly common with IBD.

Non-inflammatory period - high fiber. Oral supplements may aid in increasing energy, protein, and micronutrient intake.

11. What are some causes of malnutrition in inflammatory bowel disease.

Nutritional deficiencies result from decreased intake, altered digestion & absorption, increased losses or requirements, & drug-nutrient interactions. Fe, Ca, Se, folate, thiamin, riboflavin, pyridoxine, B₁₂, Zn, Mg, Vit A, D, K may be decreased because of malabsorption or related problems.

12. How does the pathophysiology of the disease determine the MNT recommended for malabsorption problems of Celiac disease and Crohn's disease?

Crohn's disease results from small ulcerations of the mucosa under the lymphoid tissue. Celiac disease is an autoimmune, genetic disorder characterized by atrophy of the villi, crypt hypertrophy, & damage to the microvili in the duodenum & jejunum in response to the ingestion of gluten. Accompanied by a marked reduction in absorptive surface area & decreased uptake & transport of nutrients.