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NFSC 470-MNT 1
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Case Study Questions and Responses

Understanding the Disease and Pathophysiology

1. **The small bowel biopsy results state, "flat mucosa with villus atrophy and hyperplasic crypts-inflammatory infiltrate in lamina propria." What do these results tell you about the change in the anatomy of the small intestine?**

The change of the anatomy in the GI tract and small intestine is altered due to the undiagnosed celiac disease. The results show that normal function of the small intestine wasn't occurring and absorption is not taking place. Due to inadequate digestion and absorption, the patient is experiencing secondary malabsorption.

2. **What is the etiology of celiac disease? Is anything in Mrs. Gaines's history typical of patients with celiac disease? Explain.**

Celiac disease is a disorder of the autoimmune system that causes damage to the lining of the small intestine when gluten is eaten. This damage prevents the small intestine from digesting and properly absorbing food, due to a flattening of the villi and a decreasing surface area for absorption.

3. **How is celiac disease related to the damage to the small intestine that the endoscopy and biopsy results indicate?**

When people with celiac disease eat foods containing gluten, their immune system forms antibodies that attack the intestinal lining of the GI tract. This causes inflammation of the intestines and causes flattening of the villi, which are small hair-like structures that line the small intestine. The villi become shortened in height or even flattened and thus they are not readily available to aid in the absorption of food.

4. **What are AGA and EMA antibodies? Explain the connection between the presence of antibodies and the etiology of celiac disease.**

AGA is also known as Anti-gliadin antibodies. EMA is Anti-endomysial antibodies. Both of these antibodies are associated with Celiac disease as these antibodies aid in the diagnosis of Celiac disease by detecting villous atrophy.

5. **What is a 72-hour fecal fat test? What are the normal results for this test?**

A 72-hour fecal fat test is when fecal matter is sampled over a 72-hour period. During this time samples are measured for fat content, normal results for this test are for fecal fat to be less than 7grams per 24-hours.

6. **Mrs. Gaines's laboratory report shows that her fecal fat test is 11.5g fat/24 hours. What does this mean?**

Mrs. Gaines has an abnormal high content of fecal fat matter per 24-hours. This indicates fat malabsorption, which is shown by Steatorrhea, or fatty diarrhea. A normal fecal fat test would show fat content being less than 7grams fat/24 hours.

7. **Why was the patient placed on a 100g fat diet when her history indicates that her symptoms are much worse with fried foods?**

In order to perform a fecal fat test the patient must consume 100gram of fat per day in order to challenge the small intestine to absorb fat. We know that Mrs. Gaines's symptoms worsened when fried foods are consumed, however, the accuracy of this test relies upon a set amount of consumed fat products.

Understanding the Nutrition Therapy

8. **Gluten restriction is the major component of the medical nutrition therapy for celiac disease. What is gluten? Where is it found?**

Gluten is a component of the gliadin protein found in products like wheat, barley and rye and sometimes oats. Gluten is found is wheat products, barley and rye as well as processed foods, food additives such as malt flavoring, and or "natural flavors".

9. **Can patients on a gluten-free diet tolerate oats?**

Patients on a gluten-free diet can often tolerate oats as long as the oats are not processed in a plant where cross contamination with gluten may occur. When purchasing oats patients would never buy them in bulk from food bins, and should read the label for food and nutrient warnings.

10. **What sources other than foods might introduce gluten to the patient?**

Non-food sources of gluten can be found in toothpastes, mouthwashes, shampoos, soaps, and face lotions such as a moisturizer, lipstick, and even lip balm.

11. **Can patients with celiac disease also be lactose intolerant?**

Patients who are recently diagnosed with celiac disease are commonly lactose intolerant or have a lactose deficiency. Most of the time this is only temporary and is due to the damage that was previously done in the GI tract of the small intestine and along the lining on the villi. Once the villi have regained a normal shape and can absorb food properly the lactose intolerance will generally reverse and the patient will no longer have a lactose deficiency.

Nutrition Assessment

A. Evaluation of Weight/Body Composition

12. Calculate the patient's percent UBW and BMI, and explain the nutritional risk associated with each value.

UBW: 92/112 x 100 = 82 or 18% weight loss

This shows that the patient is only 82% of her usual body weight and has therefore experience a "severe weight loss", and has lost 18% of her usual body weight. She is "severely depleted" and this indicates malabsorption of nutrients as well as inadequate food intake.

BMI: 92lbs x 705/63^2 = 16.3 Underweight, a normal BMI range is 18.5 to 24.9 and our patients BMI indicates, at a 16.3, that she is moderately underweight. She is lacking the energy stores that her body needs as her status reveals that she has "mildly depleted energy stores".

B. Calculation of Nutrient Requirements

13. Calculate this patient's total energy and protein needs using the Harris-Benedict equation or Mifflin-St. Jeor equation.

BEE= 655+(9.6 x W) + (1.8 x H) – (4.7 x A)
655 + (401.5) + (288) – (169.2) = 1,175 BEE
BEE x AF x IF
1,175 x 1.3 x 1.3= 1,986
Protein: Weight in kg x Protein need.
41.82 ~ 42.0kg x 1.3 = 50.4 grams of protein per day.

C. Intake Domain:

14. Evaluate Mrs. Gaines's 24-hour recall for adequacy.

According to the 24-intake, Mrs. Gaines's is only consuming about 400 to 500 calories, which is about one-fourth of her totally caloric needs. Her protein intake is estimated at being 7 grams and she needs to be consuming 50 or more grams of protein due to her malnourished state.

15. From the information gathered within the intake domain, list possible nutrition problems using the diagnostic term.

Inadequate oral food/beverage Intake (NI-2.1)
Inadequate protein intake (NI-52.1)
Evident protein-energy malnutrition (NI-5.2)
Inadequate carbohydrate intake (NI-53.1)

D. Clinical Domain:

16. Evaluate Mrs. Gaines's laboratory measures for nutritional significance. Identify all laboratory values that support a nutrition problem.

The laboratory values are consistent with secondary malabsorption of fat, as evidenced by the 72-hour fecal fat test. Labs show iron deficiency anemia, this is common among patients suffering from malabsorption, which is shown by her Hemoglobin (HGB) and Hematocrit (HCT) levels.

17. Are the abnormalities identified in question 16 related to the consequences of celiac disease? Explain.

Yes, damage to the GI tract and the small intestine is common among patients with Celiac Disease. When damage occurs the intestines ability to absorb foods like protein is diminished. This causes the protein to be unable to be used for energy needs by the body; this deficiency is shown by a simple blood draw and count of hemoglobin and hematocrit levels.

18. Are any symptoms from Mrs. Gaines's physical examination consistent with her laboratory values? Explain.

Yes, Mrs. Gaines stated that she is weak, tired, and "Doesn't have the energy to get off the couch", she has frequent diarrhea, and it is foul smelling. All of these symptoms are consistent with her laboratory values, which showed she has secondary Iron Anemia, due to malabsorption, which would make her feel weak and tired. After performing a 72-hour fecal fat test we found she has Steatorrhea. High amounts of fat where found in her fecal matter, this fat gives off foul smelling fecal matter, and produces frequent diarrhea.

19. Evaluate Mrs. Gaines's anthropometrics measurements.

BMI: 16.3 – this shows that the patient is significantly underweight. She is lacking the energy stores that her body needs as her status reveals that she has "mildly depleted energy stores". UBW= 82 or 18% weight loss; this weight loss is over a short period of time and in unintentional. IBW = 92/115x100= 80 the patient is only 80% of what her Ideal Body Weight should be for her height.

Interpret this information for nutritional significance.

Mrs. Gaines is not able to digest and absorb the nutrients that her body needs due to her compromised GI function. Once this problem is corrected by diet she will be able to absorb the nutrients her body requires and reverse the malabsorption that has taken place and should be able to gain the weight back that she has lost.

20. From the information gathered within the clinical domain, list possible nutrition problems using the diagnostic term.

Altered GI function (NC-1.4)
Underweight (NC-3.1)
Involuntary Weight Loss (NC-3.2)
Food and nutrition related knowledge deficit (NB-1.1)

Nutrition Diagnosis

21. Using the VA Nutrition Screening Form, what is the patient's nutrition status level?

According to the VA Nutrition Screening Form, the patient's nutrition status is at 3.

22. Select two high-priority nutrition problems and complete the PES statement for each.

Altered GI function (NC-1.4) related to intolerance of wheat, rye, barley and possibly oats due to celiac disease, as evidenced by diarrhea following meals containing gluten.

Goal: Eliminate Steatorrhea/diarrhea, and that lab values are normalized such as her Albumin and Pre-albumin as well as iron levels.
Intervention: Meals and snacks in diet are changed to gluten free, low-fat, and lactose free diets to allow her GI tract to heal and repair.

Food and Nutrition related knowledge deficit (NB-1.1) related to the consumption of gluten as evidenced by meals consisting of saltine crackers, wheat bread, and chicken noodle soup.

Goal: Patients demonstrates appropriate understanding of principles of the new diet.
Intervention: Comprehensive nutrition education. Educate patient on a gluten free diet, plus temporary lactose free and low-fat diets.

Nutrition Intervention

23. For each of the PES statements that you have written, establish an ideal goal (based on the signs and symptoms) and an appropriate intervention (based on etiology).

An ideal goal for the first PES statement would be to eliminate all symptoms of the Steatorrhea/diarrhea. This is achieved by placing the patient on a permanent gluten free diet, as well as temporary lactose free and low-fat diets.

A goal for the second PES statement would be to educate the patient on Celiac Disease and to make sure the patient can demonstrate knowledge of the gluten free diet. The patient must demonstrate an understanding as well as knowledge for meal preparation that follows the gluten free diet.

24. What type of diet would you initially begin when you consider the potential intestinal damage that Mrs. Gaines has?

Due to the severe intestinal damage that Mrs. Gaines has suffered, I would initially place her on a gluten-free diet, a lactose-free diet, and a reduced fat or fat-free diet. While the gluten-free diet will be followed for the rest of her life, the lactose-free diet and the reduced fat or fat-free diet are only temporary.

25. Mrs. Gaines's nutritional status is so compromised that she might benefit from a high calorie, high-protein supplementation. What would you recommend?

In order for Mrs. Gaines to receive a high calorie and high protein diet through added supplementation I recommend Two Cal HN by Nutren 2.0 and Deliver 2.0, or if she prefers an Ensure Plus shake.

26. Would glutamine supplementation help Mrs. Gaines during the healing process? What form of glutamine supplementation would you recommend?

A glutamine supplementation in the formula of Osmolyte 1.2 would help speed up the healing process. This can be done in the same form as the high calorie, high protein by adding Ensure Plus HN to her meals.

27. What results can Mrs. Gaines expect from restricting all foods with gluten? Will she have to follow this diet for very long?

When Mrs. Gaines restricts all food with gluten, she will begin to have energy once again as her food can be absorbed and used for energy. She will soon be able to gain the weight back that she has lost, and she will be able to eventually eliminate the abdominal pain, gas, and diarrhea that she has experienced for most of her life. Mrs. Gaines will have to follow a Gluten-free diet for the rest of her life in order to keep her GI tract healthy, and functioning properly.

Nutrition Monitoring and Evaluation

28. Evaluate the following excerpt from Mrs. Gaines's food diary. Identify the foods that might not be tolerated on a gluten/gliadin-free diet. For each food identified, provide an appropriate substitute.

Corn Flakes	Gluten-free Corn Flakes or Rice Cereal
Bologna slices	Gluten-free/Deli Sliced Turkey/Ham
Lean Cuisine-Ginger Garlic Stir Fry w/ Chicken	"Amy's" Gluten-free Entree
Skim milk	Can be tolerated
Cheddar cheese spread	Cheddar cheese slices
Green bean casserole (Mushroom Soup, onions, green beans)	Steamed green beans w/caramelized onions and toasted pine nuts
Coffee	Can be tolerated
Rice Crackers	Gluten-free rice crackers
Fruit cocktail	Fresh fruit salad
Sugar	Can be tolerated
Pudding	Gluten-free pudding/Jell-O/homemade rice pudding
V8 Juice	Can be tolerated
Banana	Can be tolerated
Cola	Can be tolerated- as long as it is produced in the U.S