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NFSC 470

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Case Study: Celiac Disease

## **I. Understanding the Disease and Pathophysiology**

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

The change in the anatomy of the small intestine indicates sever damage. When villi cannot properly absorb nutrients for the body to utilize, malnutrition can result and impairment of the small intestine occurs, commonly characterized as celiac disease. (Mayo Clinic Staff, 2013)

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

The specific etiology of celiac disease is not determined; however, it occurs as an unfavorable immune response to gluten. The unfavorable immune reaction damages the villi that line the small intestine. Over time, the lining in the small intestine is severely damaged from the inflammation, resulting in a decreased ability to absorb nutrients. Genetics and environmental conditions are also believed to play a role. (Mayo Clinic Staff, 2013)

The signs and symptoms related to celiac disease can vary depending on each individual; however, the symptoms reported by Mrs. Gaines correlate with 2 of the major signs and symptoms: diarrhea and weight loss. In addition to these classic symptoms, Mrs. Gains also reports that she doesn’t have the energy to move from the couch. In addition to the digestive problems associated with celiac disease, fatigue is also a major symptom. (Mayo Clinic Staff, 2013)

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

The endoscopy and biopsy results indicate damage to the small intestine, specially the villi. Celiac disease causes an autoimmune response, leading to the production of antibodies, and in turn, destruction and flattening of the intestinal microvilli. The damaged villi can be clearly recognized through the endoscopy and biopsy tests, indicating celiac disease. (WebMD, 2010)

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

AGA (antigliadin) and EMA (antiendomysial) antibodies are present in individuals with celiac disease and they are produced as an autoimmune response to gluten or gliadin. These antibodies identify and attack any bacteria, toxins, or viruses that the body is trying to eliminate. Testing for AGA and EMA antibodies will indicate whether or not an individual has celiac disease. (Adams, 2007)

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

A fecal fat test indicates whether or not an individual is properly digesting and absorbing fat. Steatorrhea, fat malabsorption, occurs when an individual is not digesting fat correctly. A 72- hour fecal fat test involves consuming 100 grams of fat for 3 days, followed by a collection of feces for measurements of fat loss. Normal results are less than 7 grams of fat in the stool after 24 hours. More than 7 grams of fat in the stool will indicate steatorrhea. This test is accurate in determining steatorrhea in patients. (MedlinePlus, 2013)

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

The laboratory report showing Mrs. Gaines's fecal fat was 11.5 g fat/24 hours indicates that her body is not properly digesting fat and she may be at risk of steatorrhea. Test results indicating fecal fat greater than 7 reveal an abnormality. (MedlinePlus, 2013)

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

It is crucial that Mrs. Gaines's is placed on a 100-g fat diet in order to complete a fecal fat test. After 3 days of consuming 100-g of fat, her stool can be tested and it can be determined whether or not she has steatorrhea. Since she reported 'foul smelling diarrhea', it is vital to perform the test properly. (MedlinePlus, 2013)

## **II. 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 protein found in the endosperm of wheat, rye and barley. It contains protein components that trigger the autoimmune response of the small intestine and damage the villi. (Mayo Clinic Staff, 2013)

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

Since many manufactures that produce oat products also make wheat products, cross contamination is the main danger associated with oat consumption in gluten-free diets. Oats do not contain any gluten on their own, however, unless the patient specially purchases oaks that were not made in a wheat kitchen, the patient should refrain from any oat consumption.

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

Gluten is found in various hidden places, such as; shampoo, body wash/soap, lotion, stamps, envelopes and beer.

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

Patients with celiac disease have weakened functions of the small intestine due to impaired functions of the villi. This can lead to lactose intolerance since the intestine is not functioning under optimal conditions.

### **III. 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.

$$\text{Percent UBW: } (92/112) \times 100 = 82\%$$

$$\text{Percent IBW: } (92/115) \times 100 = 80\%$$

$$\text{BMI: } 92\text{lbs}/63\text{in}/63\text{in} \times 703 = 16.3$$

Although Mrs. Gaines's %UBW is difficult to accurately report due to her pregnancy and fluctuations in weight, after determining her %IBW it is evident she is currently below her ideal body weight and her %UBW indicates moderate weight loss. Her BMI classifies her as underweight and nutritionally at risk for malnutrition.

#### **B. Calculations of Nutrient Requirements**

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

$$\begin{aligned} \text{Total Energy: } & 655 + (9.6 \times 41.8) + (1.8 \times 160) - (4.7 \times 36) = \\ & 1175 \times 1.3 \times 1.2 = 1833 \text{ kcals} \end{aligned}$$

$$\text{Protein: } 41.8 \times 1.0 \text{ g/kg} = 41.8\text{g protein}$$

#### **C. Intake Domain**

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

The foods that Mrs. Gaines has consumed in her 24-hour food recall are not sufficient to support her energy, macronutrient, or micronutrient needs. Due to her severe symptoms, she is restricting most food from her diet which is contributing to her weight loss and inadequate caloric intake. Specific amounts and details pertaining to the types of foods she consumed were not addressed in the recall.

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

Inadequate energy intake (NI- 1.4)  
 Inadequate oral intake (NI- 1.2)  
 Malnutrition (NI- 5.2)  
 Inadequate protein-energy intake (NI- 5.3)  
 Inadequate fat intake (NI- 5.6.1)  
 Inadequate protein intake (NI- 5.7.1)

**D. Clinical Domain**

16. Evaluate Mrs. Gaines’s laboratory measures for nutrition

Albumin	2.9	Low
Total Protein	5.5	Low
Prealbumin	13	Low
AGA/EMA antibodies	“+” test	Positive
Fecal Fat	11.5	High
HGB	9.5	Low
HCT	34	Low
Ferritin	12	Low
Vitamin B12	21.2	Low
Folate	3	Low

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

The abnormal lab values presented in the table above depict the values of an individual with celiac disease. The severity of her intestinal damage is preventing iron and protein absorption, along with normal GI functions. Although Mrs. Gaines is experiencing malabsorption, the amount of calories and nutrients she is consuming are not adequate enough to sustain her body, resulting in low lab values correlating with celiac disease.

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

Various symptoms from the physical examination are consistent with Mrs. Gaines laboratory values. The weakness and fatigue she is experiencing may be a result of her low HGB, HCT and ferritin levels, revealing anemia. The diarrhea she is experiencing is consistent with the values presented by her fecal fat test results, revealing steatorrhea.

19. Evaluate Mrs. Gaines's other anthropometric measurements. Using the available data, calculate her arm muscle area.

$$\text{AMA} = [(18\text{cm}/4\pi) (\pi \times .75\text{cm})]^2 = 11.8\text{cm}^2$$

Mrs. Gaines is classified in the 5<sup>th</sup> percentile for AMA, indicating severe muscle wasting.

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

Altered GI function (NC- 1.4)

Unintended weight loss (NC- 3.2)

Underweight (NC- 3.1)

#### **IV. Nutrition Diagnosis**

21. Can you diagnose Mrs. Gaines with malnutrition? If so, what type? What is your rationale?

Since Mrs. Gaines's lab values and calculations reveal she is underweight and malnourished due to low intake of food, she can be classified with malnutrition type 3.

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

Food- and nutrition- related knowledge deficit (NB-1.1) related to the recent diagnosis of celiac disease as evidenced by state of malnutrition after 24-hour recall and no prior education regarding celiac disease.

Inadequate energy intake (NI- 1.4) related to food avoidance and inability to tolerate foods as evidenced by 24-hour recall indicating low caloric intake.

## V. 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 the etiology).

Food- and nutrition- related knowledge deficit (NB- 1.1): provide patient with a thorough list of approved foods along with a list of the many hidden places gluten can hide and the affects they will have on her body. Improve the 24-hour recall by increasing caloric intake, while increasing weight status to her IBW.

Altered GI function (NC- 1.4): no consumption of any gluten or dairy products until healing of the small intestine begins. Only gluten-free products should be consumed. After a few weeks, minimal intake of dairy products can be added into the diet.

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

Due to the damage of Mrs. Gaines small intestine, it is crucial that she remain gluten and lactose-free. Once damage has been restored, dairy products can be gradually introduced to her diet. As a newly diagnosed patient, she should follow a strict diet containing solely gluten-free products, while paying close attention to hidden gluten and products that may have been produced in a gluten facility.

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

Mrs. Gaines should consume a supplement shake, such as, Boost or Ensure to provide her body with more calories and proteins, while decreasing her state of malabsorption.

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

A glutamine supplementation would help because the small intestine would utilize most of that glutamine to replenish itself. L-glutamine is easily absorbed and would assist with the natural healing process of the small intestine.

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

Mrs. Gaines can expect to start feeling better as her intestinal tract heals and begins to carry out normal GI functions. Her symptoms should diminish as long as she follows a strict gluten-free diet to avoid inflammation and any further damage to the small intestine.



## **VI. 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 indentified, provide an appropriate substitute. (Trader Joe's, 2013)

1. Cornflakes: May not be tolerated on a gluten/gliadin-free diet depending on the brand. Substitute for Glutino, Gluten Free corn flakes with strawberries or a Chex Mix brand as a more cost efficient choice.
2. Bologna slices: May not be tolerated on a gluten/gliadin-free diet if it contains certain seasonings or wheat fillers. Substitute for a plain poultry of almost any brand or choose a Bologna brand from Applegate Farms to ensure it is a gluten-free deli meat.
3. Lean Cuisine- Ginger Garlic Stir Fry with Chicken: Not tolerated on a gluten/gliadin-free diet because some noodles made in stir fries contain wheat. Substitute for Amy's Thai Stir Fry or one of the many gluten-free frozen noodle based products her company provides.
4. Skim milk: May not be tolerated on a gluten/gliadin-free diet as a newly diagnosed patient, however, as time progresses dairy products can be slowly reintroduced into the diet. Substitute for any of Trader Joe's non-dairy milk beverages; including: coconut milk, rice milk, lactose free milk, and all soy beverages.
5. Cheddar cheese spread: May not be tolerated on a gluten/gliadin-free diet if it contains certain seasonings or wheat flour. Substitute for a Trader Joe's gluten-free queso dip or gluten-free Sabra hummus.
6. Green bean casserole (mushroom soup, onions, green beans): May not be tolerated on a gluten/gliadin-free diet since the soup and fried onions contain wheat flour. Substitute the soup for a gluten-free soup found at Trader Joe's and experiment with an alternative for the fried onions, such as a gluten-free chip from Trader Joes.
7. Coffee: Tolerated on a gluten/gliadin-free diet if it is plain, unflavored coffee. If creamer is being added to the coffee, try using a lactose-free flavored creamer from Trader Joe's.
8. Rice crackers: Tolerated on a gluten/gliadin-free diet. Also try the various rice cakes offered by Trader Joe's if a variety of flavors is sought after.
9. Fruit cocktail: Tolerated on a gluten/gliadin-free diet.
10. Sugar: Tolerated on a gluten/gliadin-free diet.
11. Pudding: Tolerated on a gluten/gliadin-free diet, however, pudding should be slowly reintroduced into the diet due to the dairy present.
12. V8 juice: Tolerated on a gluten/gliadin-free diet because it is 100% vegetable juice.

13. Banana: Tolerated on a gluten/gliadin-free diet, along with the other fresh fruits.
14. Cola: Tolerated on gluten/gliadin-free diet, however, all foods/beverages containing artificial flavoring are questionable. Substitute for a Hansen's or Vintage soda from Trader Joe's

## Nutrition Assessment

Patient Interview: Patient reports weight loss, diarrhea, and extreme lack of energy

Admitting Dx: Celiac disease, malabsorption, anemia

PMH: 3 pregnancies- 2 live births, 1 miscarriage at 22 weeks.

Patient is a 36 y/o Caucasian female

Ht. 5'3" Wt. 92 lbs. BMI: 16.3 %IBW: 80% %UBW: 82% UBW timeframe: 3 months

Diet Order: Fecal fat test diet

Average Meal Intake: N/A

I/Os: N/A

GI: Inflammation of the small intestine, resulted in weakened and flattened villi

### Pertinent Labs:

- Albumin: 2.9
- Prealbumin: 13
- AgA/EMA: +
- Fecal Fat: 11.5
- HGB: 9.5
- HCT: 3.4
- Ferritin: 12
- Vitamin B12: 21.2
- Folate: 3

Pertinent Medications: Parental vitamins, Kaopectate

Physical exam/skin: Thin, pale, c/o fatigue, weakness, and diarrhea

Other info: Diminished bowel sounds

## **Nutrition Diagnosis/Diagnoses:**

Food- and nutrition- related knowledge deficit (NB-1.1) related to the recent diagnosis of celiac disease as evidenced by state of malnutrition after 24-hour recall and no prior education regarding celiac disease

Inadequate energy intake (NI- 1.4) related to food avoidance and inability to tolerate foods as evidenced by 24-hour recall indicating low caloric intake.

## **Nutrition Intervention**

Individual Treatment Goals to Address Nutrition Diagnosis

1. Educate patient on gluten-free diet
2. Ensure that there is no further weight loss
3. Decrease diarrhea
4. Improve lab values contributing to malabsorption state

Intervention Statements

1. Commercial food/beverage (ND- 3.1.1, 3.1.2)
2. Multivitamin/mineral (ND- 3.2.1)
3. Nutrition relationship to health/disease (E- 1.4)
4. Self-monitoring (C-2.3)

## **Monitoring and Evaluation**

1. Weight status
2. Stool consistency
3. 24-hour food recall
4. Normal lab values

## References

- Adams, S. (2007, March 21). *Celiac Disease Considerations for Health Professionals*. Retrieved from Celiac.com: <http://www.celiac.com/articles/1122/1/Celiac-Disease-Considerations-for-Health-Professionals/Page1.html>
- Celiac Disease Foundation. (2013). *About Celiac Disease*. Retrieved from Celiac Disease: <http://celiac.org/>
- Mayo Clinic Staff. (2013, May 22). *Mayo Clinic: Celiac disease*. Retrieved November 10, 2013, from <http://www.mayoclinic.com/health/celiac-disease/DS00319>
- MedlinePlus. (2013). *Fecal Fat*. Retrieved from MedlinePlus: <http://www.nlm.nih.gov/medlineplus/ency/article/003588.htm>
- Trader Joe's. (2013). *Dietary Lists and Guides*. Retrieved from Trader Joe's: <http://www.traderjoes.com/lists/no-gluten.asp>
- WebMD. (2010, May 18). *Digestive Disorders Health Center*. Retrieved from WebMD: <http://www.webmd.com/digestive-disorders/upper-gastrointestinal-endoscopy>