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NFSC 470
Case Study

I. Understanding the Disease and Pathophysiology

1. This tells me that the mucosa and villi of the small intestine have been altered due to illness. There is inflammation, the mucosa is abnormally flat, and the villi are atrophied. Celiac Disease frequently presents with flattened mucosa and atrophied villi.

2. The etiology of Celiac Disease is a negative immune response to gluten, specifically gliadin. Hence, this is an autoimmune disease, which is genetic. With intake of gluten (wheat, barley, rye), the immune system responds by destroying the villi of the small intestine [1]. Due to the destruction of villi, nutrients aren't absorbed and the person can become malnourished. In Mrs. Gaine's case, her diet is inclusive of gluten containing products. Her small bowel biopsy revealed flat mucosa with villus atrophy. She is also showing signs of malnourishment with a weight loss of 30 pounds, low albumin and serum protein levels; she also has a low H and H.

3. Celiac disease is a negative immune response to gluten. The immune system responds to gluten by destroying the lining of the small intestine [1]. With this destruction, the villi will atrophy, the mucosa will flatten and the epithelial cells might become inflamed. All of these are shown in Mrs. Gaine's biopsy.

4. AGA and EMA are antibodies that show inflammation and intestinal damage. Taking a simple blood test to measure these antibodies can indicate if a person has celiac disease [4, 5]. However, it might also be necessary to perform a biopsy of the small intestine if the disease is suspected despite low AGA or EMA results.

5. A 72-hour fecal fat test looks for fat malabsorption by measuring the amount of fat that is in the stool. The patient is fed a diet with 100 g of fat for three days. Stools are then collected for a 24-hour period. If there is more then 6 g of fat in the stools, then there is fat malabsorption.

6. Fecal fat of over 6 g is a sign of fat malabsorption. Mrs. Gaine's fecal fat, of 11.5 g shows she has significant fat malabsorption.

7. The patient was put on a high fat diet to confirm that she was suffering from fat malabsorption, to determine the severity of her disease.

II. Understanding the Nutrition Therapy

8. Gluten is a protein that is found in wheat, rye, and barley, and any products that contain these ingredients such as bread and cereal [3].
9. Some patients on a gluten free diet can tolerate oats. The current safe amount of oats to consume is a recommendation is 50 g of uncontaminated oats per day [2].
10. In addition to food, gluten can be found in vitamins and other supplements, medications, cosmetics and household cleaners [3].
11. People who suffer from Celiac disease often times are also lactose intolerant. This occurs because the Celiac disease destroys or alters the villi in the small intestine. These villi secrete lactase to break down the lactose in the milk, and when those villi are flattened, as in Celiac disease, the lactase is inhibited, causing lactose intolerance [4].

III. Nutrition Assessment

A. Evaluation of Weight/Body Composition

12. Mrs. Gaine's Ideal body weight is 115 lb (100+15=115); her %IBW is 80% (92/115 x 100). Her %UBW is 82.1% (92/112 x100), and her current BMI is 16.3 ((92x703)/63^2). These numbers show that she has mildly depleted energy stores, and has had severe unintentional weight loss.

B. Calculation of Nutrient Requirements

13. Mrs. Gaine's total energy needs, based on HB equation is 1833 kcals (655 + (9.6x41.8) + (1.8x160) – (4.7x36)= 1175.1x 1.3x1.2= 1833 kcal), and 1672 kcals based on kcals/kg (40x 41.8= 1672kcal). Her total protein needs are 41.8-50.2, based on her stress level and low serum proteins.

C. Intake Domain

14. The patient's 24-hour recall in not adequate for nutrients or for her condition. She is severely lacking in nutrient intake such as vitamins, minerals, fat/kcal, protein, etc. This is seen by the consumption of carbohydrates, low consumption of fruits, vegetables and protein.
15. Possible nutrition problems: Inadequate energy intake (NI-1.4), Inadequate oral food/beverage intake (NI-2.1), Inadequate protein-energy intake (NI-5.3), Inadequate protein intake (NI-52.1), Inappropriate intake of types of carbohydrate- gluten containing (NI-53.3).

D. Clinical Domain

16. Her lab values show that there are some nutrition problems. First is her serum proteins, which are 2.9 for albumin, normal is 3.5-5, then her total protein is 5.5 and normal is 6-8, and her prealbumin is 13 where normal is 15-35. She tested positive for AGA and EMA antibodies,

which indicate celiac disease and damage to the intestinal lining. Her Hgb, at 9.5(normal 12-15), and Hct at 34 (normal 37-47) are both low, which indicate anemia. Her ferritin level is also low, at 12, which is normally at 20-120, this indicates iron deficiency anemia. She also had a positive fecal fat test at 11.5 g fat in her stool. Her folate and vitamin B12 are also low which indicated macrocytic, normochromatic anemia.

17. The abnormalities listed above do coincide with celiac disease. Due to the injury to the intestine, the body cannot absorb all the nutrients the body needs. Also, due to the illness, the diarrhea that results can dehydrate the patient. The antibody tests that she tested positive for, AGA and EMA, show scientific proof that there is illness and injury to the intestines.
18. The symptoms reported in her physical exam do coincide with the test results, mainly the thin figure, due to weight loss, the fatigue, weakness and diarrhea. The fatigue and weakness could be caused by the anemia and decreased food intake. Also, the positive fecal fat test explains her diarrhea and how the intake of fried or fatty foods makes the diarrhea worse. She also had decreased bowel sounds, which is indicative of decreased motility.
19. Mrs. Gaine's arm muscle area is 11.4 = $((1.8\text{cm} \times (\pi \times .75\text{cm}))/4\pi)^2$, which is in the below average range for muscle mass [9].
20. Possible nutrition problems: Altered GI function (NC-1.4), Involuntary weight loss (NC-3.2).

IV. Nutrition Diagnosis

21. I would classify her as having protein-energy malnutrition due to inadequate intake and malabsorption. Based on her lab values, those previously stated, and most of the other values, such as: glucose, BUN, creatinine, and calcium. These levels were still within normal values, yet at the lower end of those values. Also, her albumin was low, which indicates a long-term illness.
22. (1)Food and nutrition-related knowledge deficit (NB-1.1) related to new diagnosis and no previous diagnosed family history as evidenced by a history of weight loss, diarrhea, and intake of carbohydrates containing gluten (gliadin).

(2) Altered GI function (NC-1.4) related to intake of gluten containing foods as evidenced by foul smelling diarrhea, diminished bowel sounds, and weight loss.

V. Nutrition Intervention

23. (1) An ideal goal for the first PES statement would be to change the patient's diet to a gluten-free diet, and to give her the tools to make herself healthy and stay healthy. I would start the

intervention with Comprehensive nutrition education (E-2), with emphasis on the purpose of the education and recommended modifications. (2) The ideal goal for the patient would be to return the GI function as close back to normal and healthy as possible. Also, a goal would be to treat the malabsorption/malnutrition, and promote her optimal health [7]. Intervention could start with meals and snacks (ND-1), by modifying the types of food and specifying foods/beverages or groups (specifically gluten). While she is still recovering and learning, it might also be good to intervene with vitamin and mineral supplement (ND-3.2), specifically a multivitamin.

24. The patient should be started on a gluten-free diet as soon as possible, to alleviate the symptoms of Celiac disease. She should also be on a low-residue diet until the diarrhea has diminished. Then, she should also be put on a low-lactose, low-fat, low-oxalate diet with MCT oil until the steatorrhea has resolved.
25. For a high calorie and high protein supplement I would suggest she consume some over the counter supplement shakes, such as “Boost” or “Ensure”, which are lactose and gluten free. Also, consuming small frequent meals throughout the day to increase calorie consumption.
26. Glutamine supplementation would be beneficial for the patient in her time of recovery, to help heal the lining of the intestine. The best form of glutamine for the patient would be to consume animal products such as fish, beans and other legumes. She should consume between 5 to 10 grams a day [7].
27. By restricting foods with gluten, Mrs. Gaine’s can expect the small intestine to heal, and her overall health will begin to improve. She will notice in the reduction of such symptoms as diarrhea, constipation, bloating, abdominal pain, and delayed gastric emptying [10]. The gluten-free diet has to be adhered to for the rest of her life [8].

VI. Nutrition Monitoring and Evaluation

28. Looking at the patient’s food record, there are many foods that can be tolerated, and many that cannot [1]. Foods that can be tolerated: coffee, fruit cocktail, sugar, rice crackers, banana, V8 juice, cola. The foods that cannot be tolerated, and substitutes: Bologna slices substitute with sliced deli meat (turkey, ham, etc), Lean Cuisine substitute with homemade stir fry (fresh chicken, steamed rice, fresh vegetables), green bean casserole substitute with fresh green beans. The skim milk should be avoided until the intestine has had time to heal. Can substitute with soy or rice milk. But as always, with tolerated food, make sure to read the label and make sure that the product does not contain gluten.

References

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