

Case 10: Ulcer Disease

Maria Rodriguez is a 38 year old female that has been treated as an outpatient for her gastroesophageal reflux disease (GERD), which was diagnosed about eleven months ago. She is a widow and mother of two daughters. She is Hispanic and catholic, and works in computer programming for a local firm Monday through Friday from 9:00 am to 5:00 pm. Her relevant family history consists of both her father and grandfather having peptic ulcer disease (PUD). She was referred by her gastroenterologist Dr. Anna Gustaf, MD. Her increasing symptoms of hematemesis, vomiting, and diarrhea lead her to be admitted for further gastrointestinal workup. She undergoes a gastrojejunostomy (Billroth II) to treat her perforated duodenal ulcer. After the surgery she is placed on enteral nutrition consisting of Vital HM at 25 cc/hr via continuous drip. After a nutrition consultation she is advanced to 50 cc/hr. After solid foods are slowly introduced and her weight is increased she is expected to return home. (Kurata, 1984)

Case 10-Ulcer Disease Study Questions

I. Understanding the Disease and Pathophysiology

1. Identify this patient's risk factors for ulcer disease.

Mrs. Rodriguez has many of the risk factors associated with ulcer disease. She is a 1.5 pack per day smoker, which decreases her blood supply, and has two blood relatives who have Peptic Ulcer Disease (PUD), they are her father and grandfather. She also has blood showing in both her vomit and diarrhea, which is indicative of active bleeding from an ulcer, along with pain, which is the most common symptom of PUD. Mrs. Rodriguez was also diagnosed with an ulcer two weeks prior to her current hospitalization. (361)

2. Is smoking related to ulcer disease?

Yes, smoking is related to ulcer disease because it decreases the blood supply. These include acceleration of gastric emptying of liquids, promotion of duodenogastric reflux, inhibition of pancreatic bicarbonate secretion, reduction in mucosal blood flow, and inhibition of mucosal production. Because these effects are related directly to the act of smoking and cessation of smoking is associated with the prompt recovery of the respective functions, Mrs. Rodriguez should quit smoking immediately. (Eastwood, G. 1988)

3. How is H. pylori related to ulcer disease?

H. pylori is a pivotal factor in the development of ulcers. About 92% of duodenal ulcers and 70% of gastric ulcers are caused by H. pylori. This may occur because H. pylori produces various proteins that damage mucosal cells, causing constant inflammation. By-products released result in damage to the epithelium and impair the mucous barrier in the stomach. (361)

4. This patient was prescribed four different medications for treatment of her H. pylori infection. Identify the drug functions/mechanisms. (Use table below.)

Drug	Action
Metronidazole	Antibiotic used to treat H. pylori, suppresses acid secretion
Tetracycline	Inhibits bacterial protein synthesis by blocking the attachment of the transfer RNA-amino acid to the ribosome
Bismuth subsalicylate	Antidiarrheal (mechanism of action is not understood)
Omeprazole	Proton pump inhibitor, blocks production of acid secretions

(363)

5. What are the possible drug-nutrient side effects from Mrs. Rodriguez's prescribed regimen? (See table above.) Which drug-nutrient side effects are most pertinent to her current nutritional status?

Ingesting alcohol when taking metronidazole can cause flushing, headache, palpitations, and nausea and vomiting. Tetracycline absorption can be altered by calcium and foods containing calcium. Bismuth subsalicylate does not seem to have any overt drug-nutrient interactions, but do have the side effect of altering

the absorption of some nutrients and other medications. Omeprazole depletes Vitamin B-12 stores, causing a cobalamin deficiency. The only pertinent side effects are related to her intake of calcium with the tetracycline and maintaining adequate Vitamin B-12 levels while taking omeprazole. (Anderson, 2008)

6. Explain the surgical procedure that the patient received.
Mrs. Rodriguez received a gastrojejunostomy, or Billroth II. This procedure consists of a partial gastrectomy with a reconstruction that consists of an anastomosis of the proximal end of the jejunum to the distal end of the stomach, causing a blind loop of the duodenum. (364, 365)
7. How may the normal digestive process change with this procedure?
The reduced capacity of the stomach and changes in gastric emptying and transit time dramatically alter the digestive process. The surgical procedure causes valuable components of digestion to be altered or lost, which interrupts absorption. This puts the patient at significant nutritional risk due to decreased oral intake, maldigestion, and malabsorption. (365)

II. Understanding the Nutrition Therapy

8. The most common physical side effects from this surgery are the development of early or late dumping syndrome. Describe each of these syndromes, including symptoms the patient might experience, the etiology of the symptoms, and the standard interventions for preventing/treating the symptoms.
Early dumping syndrome is characterized by an increased osmolar load entering the small intestine within ten to twenty minutes of ingestion. Symptoms include dizziness, weakness and tachycardia, caused by fluid changes in the vascular department. Late dumping syndrome occurs one to three hours after eating and its symptoms include hypoglycemia, which leads to shakiness, sweating, confusion, and weakness. Late dumping syndrome usually occurs after the ingestion of simple carbohydrates and is caused by a lack of substrate for insulin to interact with in the small intestine. The standard intervention for both early and late dumping syndrome consists of small, frequent meals and fluids in between meals. Also the patient may be asked to lay down after eating. (365, 366)
9. What are other potential nutritional complications after the surgical procedure?
Other potential nutritional concerns include increasing fat and protein intake slightly to help increase the calories for healing needs. Simple sugars and clear

liquids are avoided to prevent hyperosmolality and hypoglycemia. Lactose is not tolerated, so Vitamin D and calcium supplements are recommended. (366)

III. Nutrition Assessment

A. Evaluation of Body Weight/Body Composition

10. Assess this patient's available anthropometric data. Calculate percent UBW and BMI. Which of these is the most pertinent in identifying the patient's nutrition risk? Why?

Mrs. Rodriguez's available anthropometric data consists of:

38 yo Female

Ht.: 5'2" (1.57 m) Wt.: 110 lbs. (50 kg) UBW: 145 lbs.

Smoker with family history of PUD and DM

Diagnosed with GERD 11 months prior and duodenal ulcer two weeks prior, had a gastrojejunostomy and a feeding jejunostomy was placed during surgery.

Currently NPO.

Medications include: bismuth subsalicylate, metronidazole, tetracycline, and omeprazole.

According to her anthropometrics, Mrs. Rodriguez is at an increase risk for PUD based on family history, her current ulcer and her smoking habits. She has lost a significant amount of weight and is at risk for malnutrition.

$\%UBW = 110\text{lbs.} / 145\text{ lbs.} \times 100 = 75\% \rightarrow \text{High risk}$

$BMI = 50\text{ kg} / 1.57\text{ m}^2 = 20.3 = 20 \rightarrow \text{WNL}$

Her percent of usual body weight is the more pertinent measurement because it shows a dramatic weight loss that is directly related to her disease state. She is only 75% of her usual weight, which shows concrete information to begin nutrition intervention to prevent further weight loss.

11. What other anthropometric measures could be used to further confirm her nutritional status?

Other measures could include her percent of ideal body weight to measure how far below normal levels she is currently.

B. Calculation of Nutrient Requirements

12. Calculate energy and protein requirements for Mrs. Rodriguez. Identify the formula/calculation method you used and explain the rationale for using it.

Mifflin-St. Jeor equation: $([10 \times \text{Wt (kg)}] + [6.25 \times \text{Ht (cm)}] - [5 \times \text{age}] - 161) \times \text{activity factor}$

$([10 \times 50\text{ kg}] + [6.25 \times 157\text{ cm}] - [5 \times 38] - 161) \times 1.2$

$$(500 + 981 - 161) \times 1.2$$

$$1320 \times 1.2 = 1584 \text{ kcal}$$

$$1584 \text{ kcal} \times 0.20 = 316 \text{ kcal protein} = 79 \text{ g protein}$$

The Mifflin-St. Jeor method is the most widely accepted energy requirement estimate.

C. Intake Domain

13. This patient was started on an enteral feeding postoperatively. Why do you think this decision was made?

This decision was probably made after assessing the patient's ability to take in food orally. After finding that she was unable to use part of her gut, the jejunostomy was placed to bypass the compromised portion of her digestive tract, yet still utilize the functional portions.

14. What type of enteral formula is Vital HN? Is it an appropriate choice for this patient?

Vital HN is a peptide-based, elemental, low-residue feeding intended as a source of complete and balanced nutrition for patients with chronically impaired gastrointestinal function. This formula is appropriate for Mrs. Rodriguez because it aids in the absorption of protein and can be used as a sole-source of nutrition. It is also lactose-free which works with her medication regimen. (Abbott Nutrition, 2011)

15. Why was the enteral formula started at 25 cc/hr?

Mrs. Rodriguez was started at 25 cc/hr so as to slowly integrate the nutrition into her system and prevent any dumping syndrome or digestive tract discomfort.

16. Is the current enteral prescription meeting this patient's nutritional needs?

Compare her energy and protein requirements to what is provided by the formula. If her needs are not met, what should be the goal for her enteral feeding?

Her current prescription is only providing Mrs. Rodriguez with 1200 kcal per day. She needs to be increased to about 65 cc/hr to ensure adequate nutrition. The formula provides one kcal per mL, so she needs to receive 1600 mL daily to ensure she reaches her energy requirement of 1600 kcal. The formula also provides 62.5 grams of protein per every 1500 mL, which falls within the range for Mrs. Rodriguez's needs. (Abbott Nutrition, 2011)

17. What would the RD assess to monitor tolerance to the enteral feeding?

The RD would monitor Mrs. Rodriguez nausea, vomiting and diarrhea, as well as her weight gain or loss over time.

18. Go to the patient care summary sheet. For postoperative day 2, how much enteral nutrition did the patient receive? How does this compare to what she prescribed?

On postoperative day 2 Mrs. Rodriguez received 1150 mL of enteral nutrition, which falls extremely short of her necessary 1600 mL needs. Her enteral feedings needs to be increased immediately.

19. When evaluating the patient care summary sheet, you notice the patient has gained 1 pound in 24 hours. Should you address this in your nutrition note as an improvement in nutritional status.

I would not note the gain as an improvement in nutritional status because it is a very slight gain. If she continuously gains weight over the course of a few days, then I would include the information in my note.

20. As this patient is advanced to solid food, what modifications in diet would the RD address? Why? What would be a typical first meal for this patient?

The RD would address changes in food consistency and even temperature and size of meals, as well as the frequency of feedings. The patient would experience five or six small, soft, room temperature meals per day. A typical first meal could be a small bowl of oatmeal or yogurt with fruit juice. (68)

21. What other considerations would you give to Mrs. Rodriguez to maximize her tolerance of solid foods?

I would give Mrs. Rodriguez the option to have some of her favorite foods to stimulate her appetite, or stay with foods that do not have a strong odor. I would also examine the osmolality of foods she regularly consumes to prevent hyperosmolarity. Finally, I would ensure an environment that is conducive to eating orally. (68)

22. Mrs. Rodriguez asks for you to come to her room because she is concerned that she may have to follow a special diet forever. What might you tell her.

I would assure Mrs. Rodriguez that she will be able to eat regularly again soon, but that she must follow the nutrition prescription correctly for the prescribed

amount of time to ensure that she does not worsen her condition. She should not worry, because her diet will become more normal soon.

23. Should Mrs. Rodriguez be on any type of vitamin/mineral supplementation at home when she is discharged? Would you make any recommendations for specific types?

Mrs. Rodriguez should take a Vitamin D and calcium supplement to compensate for her tetracycline intake. She should also take a Vitamin B-12 supplement to balance her omeprazole intake. As well as an iron supplement to prevent anemia. I would not recommend any specific brands, but whatever fits her budget would be fine. (366)

24. Why might Mrs. Rodriguez be at risk for iron-deficiency anemia, pernicious anemia, and/or megaloblastic anemia secondary to folate deficiency and/or poor vitamin B-12 absorption?

The vitamin B-12 deficiency would be a result of the omeprazole she is currently prescribed, this would aid in her folate deficiency which would cause the different types of anemias.

25. Will the oral vitamin/mineral supplement be adequate to prevent the anemias discussed in question 24? Explain.

Supplements alone will not be enough to prevent the anemias. She will need to include iron-, folate-, and cobalamine-rich foods in her diet. Such foods include green leafy vegetables, animal products, and red meat.

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

Inadequate protein-energy intake: NI-5.3

Inadequate vitamin intake (B12): NI-5.9.1(11)

Inadequate energy intake: NI-1.4

(American Dietetic Association, 2011)

D. Clinical Domain

27. Using her admission chemistry and hematology values, which biochemical measures are abnormal? Explain.

Upon admission, Mrs. Rodriguez has high levels of white blood cells, reading 16.3, where as 4.8-11.8 is considered normal. She also has an increased ferritin levels of 241, where 20-120 is considered normal. Her transferrin is also

considered above normal value. Her red blood cell distribution width (RDW) is high at 19.5, where the normal range is 11.6-16.5. Mrs. Rodriguez also has values that are below normal limits. Her hemoglobin and hematocrit values are both below normal, as well as her mean cell hemoglobin content (MCHC). Also her lymphocyte count is below normal values. Other low values include her albumin, prealbumin and total protein.

- a. Which values can be used to further assess her nutritional status? Explain. Her albumin, prealbumin and total protein values can be used to assess her protein status. Her iron and folate status' can be monitored through her hematology values, such as her hemoglobin and hematocrit levels. (366)
- b. Which laboratory measures (see lab report, pages 117-118) are related to her diagnosis of duodenal ulcer? Why would they be abnormal? Special consideration should be paid to her hemoglobin, hematocrit, ferritin, serum iron and serum B-12 levels, as well as visceral protein status' of albumin and prealbumin. These values may be abnormal because of deficiencies in iron, folate or B-12, as well as steatorrhea or malabsorption. (366)

28. Do you think this patient is malnourished? If so, why? What criteria can be used to diagnose malnutrition? Within what category does this patient fit? I do believe Mrs. Rodriguez is malnourished. I believe this because of the amount of weight she has lost and her hematology results. Malnutrition can be diagnosed through percent usual body weight, in which Mrs. Rodriguez is only 75% of her usual body weight. This places her in the high risk category of malnutrition. She needs to gain weight as soon as possible. (48)

IV. Nutrition Diagnosis

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

Inadequate energy intake, related to excessive weight loss, related to 75% usual body weight.

GERD, related to increased acid secretions, as evidence by duodenal ulcer.

V. Nutrition Intervention

30. 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).

PES: Inadequate energy intake, related to excessive weight loss, related to 75% usual body weight.

Goal-Return to usual body weight of 145 pounds

Intervention-Increase energy intake

PES: GERD, related to increased acid secretions, as evidence by duodenal ulcer.

Goal-Decrease acidic secretions

Intervention-Prescribe medication to control the GERD

31. What nutritional education should this patient receive prior to discharge?

Mrs. Rodriguez should receive information about foods with low osmotic values, as well as what foods affect her GERD and acid levels in her stomach. She should also be informed of the drug-nutrient interactions of the medications she is taking and how to avoid ulcers in the future through proper nutrition. (363)

32. Do any lifestyle issues need to be addressed with this patient? Explain.

Yes, she needs to be informed of the negative side effects of her smoking habit, and be encouraged to join a smoking cessation group. She also should be aware of high-acidic foods in her diet and how to avoid them.

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