Ulcer Disease: Medical and Surgical Management

Case Study
MNT II Spring 2014
Due February 20, 2014

"Team TOTS"

Understanding the Disease and Pathophysiology

1. M.R presents with multiple risk factors for the development of ulcer disease. The patient's biopsy two weeks ago indicated the presence of Helicobacter pylori (H. pylori) bacteria, and numerous studies have identified H. pylori as a major risk factor for the development and diagnosis of ulcer disease[1,2]. H. pylori in combination with the patient's generalized gastritis may have placed the patient at further risk for the development of a duodenal ulcer[1]. The patient's history indicates she is a tobacco user. Use of tobacco products increases a person's risk for ulcer disease[1,2]. According to the nutritional assessment of the patient's usual dietary intake prior to the onset of her current illness, M.R. consumed 8-10 cups of coffee and 1-2 soft drinks daily. Coffee and soft drinks have both been shown to impact acid secretion in the gastrointestinal tract and increase a patient's risk for developing an ulcer[2].

2. Studies have correlated individuals who smoke with an increased risk for the development of peptic ulcer disease compared to nonsmokers[1]. Smoking results in increased gastric acid production and secretion, increased duodenogastric reflux, decreased gastroduodenal prostaglandin production due to interference of histamine-2 antagonists, and decreased pancreaticoduodenal bicarbonate production[1,3]. Cigarette smoking contributes to the production of hydrocarbons and oxygen radicals, which may further contribute to smoking's harmful effects on the lining of the gastrointestinal tract[4]. Smoking also increases the risk and rapidity of ulcer reoccurrence and perforation[4].

3. Helicobacter pylori is a gram-negative bacteria that causes infection and induces a natural, whole body immune response resulting in inflammation[4]. Peptic ulcers are most commonly caused by H. pylori infection in the gastrointestinal tract and an estimated 92% of duodenal ulcers are due to H. pylori infection[2,4]. H. pylori is resistant to the acidic environment of the stomach, which results in the bacteria's ability to damage the protective mucosal lining of the stomach and duodenum. Without the protection of the mucosal lining, stomach acid damages the more sensitive inner lining and an ulcer is able to form[5]. In the presence of increased gastric acid secretion, decreased bicarbonate secretion, and H. pylori infection the development of a gastric outlet obstruction commonly occurs[4].

4.

Drug	Action
Metronidazole	Metronidazole is an antibacterial and antiprotozonal agent. The drug enters the bacteria or protozoa cell by passive diffusion in the inactive state and becomes active when it comes in contact with the cytoplasm of the cell's organelles[4]. Scientists know that the mechanism of action includes the inhibition of DNA synthesis and induces oxidative damage to DNA by that results in strand breaks in the DNA leading to cell death[4]. In H.pylori specifically, susceptibility of metroidazol involves a 2-electron transfer step to reduce the compound using an oxygen-insensitive nitroreductase rdxA[4].
Tetracycline	Tetracycline is used as a treatment for bacterial infections. It

	works by preventing the growth and spread of bacteria[6]. The drug reversibly binds to the 30S ribosomal subunit of the bacteria acting as a competitive inhibitor by blocking the incoming aminoacyl tRNA from binding[7]. Tetracycline also acts as a protein synthesis inhibitor by preventing new amino acids from binding[8].
Bismuth Subsalicylate	Bismuth Subsalicylate is a mild antibiotic and antacid used to treat nausea, heartburn, indigestion, upset stomach, diarrhea and other discomforts of the stomach and gastrointestinal tract by stimulating absorption of fluid and electrolytes across the small intestinal wall[9]. Bismuth Subsalicylate induces an anti-inflammatory effect by inhibiting the synthesis of prostaglandin responsible for intestinal inflammation and hypermotility[9]. It is hydrolyzed in the stomach to the compounds bismuth oxychloride and salcyclic acid and any non-disassociated bismuth reacts with the anions bicarbonate and phosphate to form bismuth salts[9]. In the colon non-disassociated bismuth subsalicylate and other bismuth salts react with hydrogen sulfide to produce bismuth sulfide, which is responsible for the darkening of stools[9].
Omeprazol	Omeprazol is used as a treatment for GERD and other conditions causing increased acid production in the stomach[10,11]. It is commonly prescribed for the treatment of ulcers and for the prevention of the return of ulcers that may be caused by H.pylori[10,11]. Omeprazol is a proton pump inhibitor, which decreases the amount of acid made by the stomach[10,11]. It suppresses gastric acid secretion by inhibiting the H+/K+ATPase Enzyme system at the secretory surface of the gastric parietal cell and blocking the final step in acid production[10,11].

5.

Drug	**Drug-nutrient Interactions**
Metronidazole	Metronidazole may result in anorexia, gastrointestinal distress, stomatitis, and a metallic taste in the mouth[4]. Metronidazole results in a disulfram-like reaction when ingested with alcohol, which may cause dilation of blood vessels, low blood pressure, and increased risk for heart disease[12].
Tetracycline	Dairy products, antacid medications, and vitamin and mineral supplements containing iron may interfere with the effectiveness of tetracycline[13]. Tetracycline binds Mg, Ca, Zn, and Fe, forming a complex with these essential minerals and inhibiting their absorption[4]. The binding of calcium may also reduce the

	absorption of the drug and other antibiotics[14]. It will also decrease vitamin K production by intestinal bacteria and may interfere with vitamin B absorption and utilization[4]. Vitamin A consumption with tetracycline may increase the risk of benign intracranial hypertension[4].
Bismuth Subsalicylate	Bismuth Subsalicylate may effect the absorption of vitamin B12 due to its effects on acid production in the stomach[14]. The antibiotic effects of the drug may impact intestinal bacteria’s ability to synthesize vitamin K, which may effect a patient’s normal blood clotting mechanisms[14]
Omeprazol	Omeprazole inhibits the absorption of folic acid and vitamin B12 because it decreases the amount of acid produced in the gastrointestinal tract, which is a required component of the absorption of these nutrients[4].

Tetracycline and omeprazole may have the greatest impact on the patient’s nutritional status because of the potential decrease in B vitamin absorption[4,14]. The iron binding capacity of tetracycline and omeprazol’s inhibition of folic acid and vitamin B12 absorption are a concern in this patient due to her malnourished state prior to surgery and the Billroth II procedure’s decrease in absorptive capacity and surface area of the gastrointestinal tract[4,14].

6. The gastrojejunostomy or Billroth II is classified as a partial gastrectomy. During this procedure, the antrum of the stomach is surgically removed and an anastomosis is formed between the remaining portion of the stomach and the proximal loop of the jejunum[4,15]. The first section of the small bowel, the duodenum, is preserved in this procedure[4,15]. This allows for bile and the pancreatic enzymes necessary for digestion and absorption to continue to be released and carry out their function in the small intestine[4,15].

7. The removal of the distal portion of the stomach results a smaller volume of food that can be held in the stomach at one time[4,16]. This may lead to early satiety at mealtimes, resulting in decreased intake. The smaller holding capacity of the stomach may also contribute to the development of dumping syndrome because hyperosmolar food is rapidly entering the small intestine[4,16]. Gastric stasis may also occur in some patients. Gastric stasis increases the patient’s risk for bezoar formation, bacterial overgrowth, and the development of intolerance to solid foods[16]. The antrum is responsible for the separation of food particles in the stomach. The antrum is removed in this procedure, which allows for larger than normal food particles to enter the small intestine. The small intestine does not have the full capacity to break these particles down[16]. The antrum of the stomach is also where stomach acid is released, which serves to activate the digestive enzymes pepsin and lingual lipase, helps to liquefy food into chyme by breaking up the connective tissue of plant cell walls, converts ferric iron to the absorbable ferrous form, and destroys pathogens entering the gastrointestinal tract[17]. The loss of such a large portion of the stomach results in fewer parietal cells. These cells are responsible for the secretion

of intrinsic factor, which is essential for the absorption of B12[17]. This secretion of intrinsic factor is the only indispensible function of the stomach[4,16,17].

Although the duodenum is preserved and bile and pancreatic enzymes are still released into the small intestine as normal, full mixing of food and enzymes for adequate absorption may not occur[16]. This is because food, bile, and enzymes do not enter the small bowel in the same location, resulting in dysynchrony[16]. Because chyme will never physically enter the duodenum, there is less total area for absorption in the small bowel. This may result in the patient’s decreased absorption of nutrients[4,16].

Understanding the Nutrition Therapy

8. Dumping syndrome is the result of a rapid movement of food through the gastrointestinal tract, and is a common complication after gastric surgeries such as the Billroth II our patient underwent[18]. Dumping syndrome may occur in two forms, early or late, which have different etiologies and symptoms described below.

Early dumping syndrome occurs 30-60 minutes following a meal, and symptoms include early satiety, abdominal cramping and pain, nausea and/or vomiting, severe diarrhea, sweating, flushing, feelings of light-headedness, and rapid heartbeat[18,19]. The surgical procedure results in a decreased space for contents to be held in the stomach and a lack of the pyloric sphincter. This causes an increased emptying of the stomach contents into the small intestine before contents have been adequately digested for final breakdown and absorption in the small bowel[18,19]. This rapid influx of hyperosmolar contents into the duodenum results in a rapid shift in osmotic pressure causing water to be pulled from the blood into the small bowel causing the GI symptoms listed above[18,19]. Cardiovascular effects that occur in early dumping syndrome may be attributed to a hormonal response and the release of serotonin, a vasodialator, which may result in the flushing, hypotension and increased gastric emptying that occurs in early dumping syndrome[18,19]. Prevention methods for early dumping syndrome include avoiding the consumption of liquids 30-60 minutes before and after a meal, consuming small, frequent meals instead of the common 3 large meals a day, and educating the patient on the importance of listening to her hunger cues[19]. The patient should also be educated on the importance of taking smaller, easier to digest bites and the importance of the thorough chewing of foods before swallowing[19]. If the patient has symptoms of light-headedness, avoiding reclining the hospital bed following a meal may help to relieve symptoms[19].

Late dumping syndrome occurs 1-3 hours following a meal, and symptoms include fatigue and/or weakness, flushing, sweating, shakiness, dizziness, fainting, mental confusion, feelings of hunger, rapid heartbeat, and low blood sugar[18,19]. These symptoms are thought to be do to the rapid rise and fall of a patients blood sugar following a meal, which is termed reactive hypoglycemia[18,19]. The physical changes of the gastrointestinal tract due to surgery results in large concentrations of carbohydrates entering the small intestine and a subsequent rapid absorption of glucose into the blood stream[18]. This results in an increased release of insulin from the pancreas and rapid cellular uptake of glucose leading to hypoglycemia[18]. Foods containing simple sugars such as candy, sweet drinks, cakes, pastries, and cookies can further exacerbate symptoms and should be avoided[19]. Increasing fiber consumption may slow the gastric emptying

and movement of food through the gastrointestinal tract[2,19]. Guar gum, pectin, and glucomannan supplemental fibers have the ability to increase the viscosity of food in the gastrointestinal tract and bind carbohydrates, which leads to slower absorption of dietary glucose and may prevent reactive hypoglycemia[19].

9. The Billroth II procedure results in a decreased capacity of the stomach to hold nutrients, resulting in a rapid movement through the gastrointestinal tract. The rapid movement of food coupled with the dyssynchrony of where food enters the small intestine and the entrance of digestive enzymes further up at the jejunum results in a patient’s increased risk for malabsorption[4,16]. The nutrients most likely to be malabsorbed include:

- Lactose- The enzyme lactase, which is responsible for the breakdown of lactose to galactose and glucose, is found primarily in the villi of the jejunum[20]. This form of lactose intolerance is termed “functional lactose intolerance” because the jejunum is preserved in the Billroth II[20]. Patients who experience lactose intolerance following gastric surgery may regain tolerance as regular eating is resumed over several months[4].
- Fat- Fat malabsorption, or steatorrhea, results when greater than 7% of dietary fat is excreted in the stool[4]. Malabsorption of fat may be due to a decrease in gastric lipase production, dysynchrony of pancreatic enzymes and food entrance into the small intestine, and the rapid influx of nutrients into the small intestine due to the lack of control mechanisms such as the loss of the pyloric valve and cholecystokinin’s release in the duodenum[18]. Fat malabsorption may also result in the malabsorption of the fat soluble vitamins A,D,E, and K, which will result in deficiencies of these vitamins if they are not monitored and replaced as necessary[18].
- Vitamin B12- Absorption of vitamin B12 requires a complex to form with intrinsic factor, which is produced in the stomach[20]. Secretion of intrinsic factor is the only function of the stomach that is completely indispensible[17]. If vitamin B12 cannot be absorbed adequately due to either a lack of intrinsic factor of the reduced acid secretion required to cleave B12 from its protein-bound form, the patient is at an increased risk of developing megaloblastic anemia and pernicious anemia[4,16,17].
- Folate- The first site of folate absorption is at the duodenal portion of the small intestine[16]. Although the duodenum is preserved in the Billroth II, no nutrients are absorbed there because food enters the small intestine down at the jejunum. This decreases the surface area normally available for folate absorption and may result in pernicious and/or megaloblastic anemia[16].
- Iron- Iron is primarily absorbed in the duodenum[16]. Although it may still be absorbed in the jejunum and ileum of the small intestine, the loss of the duodenal absorptive capacity may result in iron deficiency and microcytic anemia[16]. Additionally, the reduced secretion of gastric acid reduces the capacity to convert ferric to the bioavailable ferrous iron, which further increases a patient’s risk for the development of iron deficiency[4,16].
- Calcium- Calcium has been indicated as a nutrient of concern for gastric surgery patients due to a prevalence of bone disease in this patient population[18]. Calcium’s main site of absorption is the duodenum, which may contribute to the etiology of calcium deficiency following gastric surgery. Additionally, fat malabsorption may result in the formation of insoluble calcium soaps and an inability to absorb dietary calcium[18].
- Other nutrients of concern include selenium because it is primarily absorbed in the duodenum, vitamin B1 (thiamine), and copper[2].

10. The Academy of Nutrition and Dietetics recommends gastric surgery patients be placed on a liquid vitamin and mineral supplement immediately following surgery[2]. The vitamin and mineral supplement should be prescribed in a liquid form because of the patient's decreased ability to breakdown and absorb nutrients due to surgery[2,4]. This supplement should provide at least 100% of the DRI for all nutrients, and M.R. may require additional ferrous iron, calcium, vitamin D and folate if a deficiency is officially diagnosed and because she is at an increased risk for developing a deficiency due to the surgery and medications she is currently taking[2]. B12 injections may be necessary if M.R. is determined unable to produce adequate intrinsic factor for B12 digestion and absorption[2].

Nutrition Assessment

11. Prior to be diagnosed with GERD, Mrs. Rodriguez weighed 145 lbs. Calculate %UBW and BMI. Which of these is the most pertinent in indentifying the patient's nutrition risk? Why?

%UBW = actual BW/ Usual BW

- %UBW=76% (moderate malnourished)

BMI=Weight (kg)/Height (m^2)

- BMI=20.2 kg/m^2 (Normal).

%UBW is more pertinent in this case. Although our pt's BMI indicates that it is a normal body weight for her height, the amount of weight loss she experienced over 11 months is classified as severe weight loss and may have resulted in a significant loss of muscle and fat mass. Weight loss prior to surgery may effect the patient's recovery time and outcomes post-surgery[2,4].

13. The pt's estimated energy and protein requirements are increased due to increased demands of surgery recovery and the pt's malnourished state. The pt's estimated energy needs were determined using the Mifflin-St Jeor equation using an injury factor of 1.4. This was compared to an estimated need of 35 kcal/kg to determine the patient's estimated energy requirement of 1750-1819 kcal/day. The patient's protein requirements were calculated using 1.5-2.0 g/kg because it was determined the patient has an increased need for protein for successful recovery from surgery and to regain body, muscle, and fat mass. The patient's protein requirements are 75-100 g/day.

Mifflin-St Jeor (AF 1.0, IF 1.4) and pt's actual body weight:

REE = 10(50 kg) + 6.25(157.48 cm) – 5(38 yo) – 161
1299 kcal/day * 1.4
1819 kcals/day

35 kcal/kg (50 kg) = **1750 kcal/day**

1.5 g/kg (50 kg) = 75
2.0 g/kg (50) = 100 g
75-100 grams of protein/day

14. Peptamen AF is an enteral formula used to meet the nutrient needs of patients requiring a specialized formula to help manage an inflammatory response due to disease or injury and help gastrointestinal absorption of nutrients[21]. The formula also contains EPA and DHA omega-3 fatty acids, vitamins C and E, selenium and a soluble fiber blend[21].

According to ASPEN guideline E 1, the use of formulas with immune modulating ingredients such as omega-3 fatty acids and antioxidants should be reserved for patients who are critically ill, recovering from major surgery, or recovering from trauma, burns, or cancers of the head and neck. Patients who do not meet these criteria should be given a standard formula[20]. The Academy of Nutrition and Dietetics’ Nutrition Care Manual states a polymeric formula with added fiber should be used with GI surgery patients unless there is evidence for intolerance or malabsorption[2]. Based on these guidelines, Peptamen AF is not appropriate for M.R. and the standard formula Jevity 1.2 should be used for nutrition support. Jevity 1.2 is high in calories (1.2 kcal/ml) and protein (55.5 g/L) and contains added fiber as recommended by the Nutrition Care Manual. The formula also contains added prebiotics to promote the growth of healthy bacteria in the colon[22].

15. ASPEN guideline A4, Enteral feeding should be started early within the first 24-48 hours following admission, and feedings should be advanced towards the goal over the next 48-72 hours[23]. This decreases the risk of infection, decreases the release of inflammatory factors such as TNFα, and decreases the permeability of the gut[23]. Beginning feedings at a rate lower than the goal will also allow for the evaluation of the patient’s tolerance to the formula and mode of feeding[4,23].

16. The formula prescribed to this pt does not meet her nutritional needs. The current goal rate of 50 mL/hr would only provide the pt with 1320 kcal when the energy needs of the patient are 1750-1819 kcal/day. The goal rate for this patient should be 67 mL/hr providing the pt with 1785 kcal

17. The registered dietitian should monitor a variety of physical and biochemical factors to assess the patient’s tolerance of enteral feeds. The patient’s I/O records should be monitored daily. These values indicate if the RD’s orders are being followed and if the patient is receiving the appropriate feedings at the prescribed rate[2]. A patient’s bowel movements and sounds should be monitored daily to determine the presence of uncontrolled diarrhea, the presence of constipation, to determine the patient’s tolerance of the tube feed composition and rate, and to determine the functionality of the gastrointestinal tract[2]. There should be no S/S of abdominal distention, pain, or toughness[2]. The patient’s weight should be monitored daily and remain stable over the time span of 3-4 days. A rapid increase or decrease in weight indicates intolerance to fluids or the possibility that the patient is not receiving enough from the tubefeeding through inadequate tube feeding rate, stopping of the tube feeding or malabsorption[2]. Biochemically, the patient’s electrolyte, phosphorus, and magnesium levels should be assessed at baseline and monitored daily until levels are stable. These lab values should continue to be monitored once or twice per week to ensure they remain stable[2]. Because of the patient’s severe weight loss prior to surgery, she should be monitored for risk of refeeding syndrome, and phosphate, magnesium, and phosphorus should be evaluated daily as feeding is advanced[2]. The patient’s blood glucose

should be monitored every 6-8 hours the first day of tube feeding, and then every 3-4 days if blood glucose is within normal limits[2]. M.R. has elevated blood glucose based on the results of the last labs; therefore her blood glucose should be monitored daily until it returns to normal levels. Because the patient is at risk for anemias due to the surgical alteration of her gastrointestinal anatomy and the medications she is currently on, hemoglobin and hematocrit levels should be monitored to evaluate nutrient malabsorption and the possible need for an elemental formula or a separate vitamin and mineral supplement.

18. On day 3 the patient received a total of 450 mL of Peptamen AF via a continuous drip, this indicates the rate of infusion was an average of 20 mL/hr. This does not meet the 25 mL/hr initial enteral infusion rate and would only provide the patient with 540 kcal, 34 g of protein, and 365 mL of free water and the starting infusion rate of 25 mL/hr should provide the patient with 660 kcal, 42 g of protein, and 446 mL free fluid per day[21]. It is also apparent the prescribed goal rate of 50 mL/hr, which the patient should be advancing towards by day three of her care, is not being met. The patient is not receiving adequate nutrition via her tube feedings and tube feedings should be monitored and evaluated to determine the reason why the prescribed goal rate is not being reached.

19. The patient’s stomach has a reduced holding capacity and the small intestine has a smaller surface area to absorb nutrients from the diet, therefore the patient should consider consuming smaller, frequent meals versus the 3 larger meals she typically consumed prior to diagnosis of GERD and the development of the duodenal ulcer[2,4,16,18]. The patient should aim to consume foods higher in fiber in order to slow down the movement of food through the gastrointestinal tract, allowing for more time for nutrients to be absorbed[2,4,16,18]. The patient should aim to consume liquids 30-60 minutes prior to eating her meals because liquids at meals may cause symptoms of dumping syndrome[2,4,16]. Lactose may not be tolerated initially and the patient may benefit from eliminating milk-based products initially after surgery and discharge from the hospital and then slowly integrating milk-based foods back into her diet to evaluate her tolerance to the foods[2,4]. Simple sugars should be avoided as they move rapidly through the gastrointestinal tract and place the patient at a reduced capacity for maximal absorption[2,4].

The patient is already receiving ice chips by mouth, and this should continue to prepare the patient for a transition to solid foods. Once the patient is believed able to tolerate foods orally, the first foods should be in the form of liquids such as a broth that will be easy to digest. A first meal of solid foods should contain a combination of two out the three macronutrients (carbohydrates, fat, and protein), and should be small and easy to digest. An example may be a piece of toast and an egg.

22.

Lab Value	Nutrition and Disease Indicator
Glucose ↑	Elevated blood glucose following surgery is an indicator of a physiological stress response due to the release of catecholamines stimulating liver glucose production[24]. The stress response may be prolonged due to the duration of the patient’s illness and H. pylori’s inflammatory

	effects. The patient’s blood glucose was WNL prior to surgery and is elevated on 9/3. As the patient recovers glucose should be monitored and evaluated daily until labs return to normal.
Magnesium ↓	Reduced magnesium levels are an indication of malnutrition, and low serum levels indicate the body’s storage is reduced up to 20%[24]. Magnesium is also a key factor in calcium absorption and metabolism. Additionally, a magnesium deficiency results in the pulling of calcium from the bones[24].
Calcium ↓	Serum calcium is not an indication of calcium absorption from the diet, but indicates the amount of calcium bound to albumin in the blood[24]. The combination of a low albumin level and low calcium is an indication of malnutrition[24]. The patient’s low magnesium may also contribute to low calcium levels, and this is termed refractory hypocalcemia[24].
Albumin ↓	Albumin levels will decrease as a result of acute or chronic stress and may not be an adequate indicator of a patient’s nutritional status in the hospital[24]. Albumin is responsible for binding calcium and may be responsible for a decrease in serum calcium[24]. The patient’s albumin levels were low before and following surgery and may be rising to normal limits. Because albumin can be decreased due to inadequate oral intake, malabsorption, and acute stress that may be due to surgery and/or infection this value should be monitored and evaluated until WNL[24].
Prealbumin ↓	Prealbumin has a shorter half life than albumin, and may be a better indicator of nutritional status in the hospital, but it too may be decreased due to a stress response to surgery and/or infection[24]. Prealbumin has been decreased before surgery and was further decreased following surgery, therefore prealbumin levels should be measured for further evidence of a metabolic response due to surgery, malnutrition, and infection.
Hemoglobin ↓	Hemoglobin is the more direct measure to assess for iron deficiency[24]. Low levels of hemoglobin in the blood may indicate iron-deficiency anemia, pernicious anemia,

	megaloblastic anemia, hemorrhage, or malnutrition in this patient due to her reduced capacity to absorb iron, folate and B12 and severe weight loss.

23. According to current guidelines by A.S.P.E.N. and The Academy of Nutrition and Dietetics, two of six criteria must be identified as present in order to diagnose a patient with malnutrition[23]:

1. Insufficient energy intake
2. Weight loss
3. Loss of muscle mass
4. Loss of subcutaneous fat
5. Localized or generalized fluid accumulation
6. Diminished functional status as measured by handgrip strength

M.R. lost 24% of her body weight in the 11 months since her diagnosis of GERD. Any amount of weight loss greater than 20% in a one-year period is classified as severely malnourished[23]. This weight loss combined with the patient’s account of decreased energy intake in the two weeks since the diagnosis of her ulcer allow for the diagnosis of malnutrition. Decreased protein lab values on two occasions indicate this patient may also be losing muscle mass, but a physical assessment is not available to assess this further. When determining the etiology of the patient’s malnutrition the time that the weight loss occurred was our primary factor considered. The patient was diagnosed with GERD about 11 months and lost 24% of her body weight, which we attribute to the patient’s report of decreased intake and a coupled malabsorption due to the development of a duodenal ulcer, inflammation of the stomach. This is evidenced by the patient’s complaints of nausea, diarrhea, and vomiting upon admission. Although the patient does present with signs and symptoms of an inflammatory response such as elevated body temperature, fluid accumulation, and decreased albumin, these signs and symptoms are likely due to the surgery and will resolve as the patient’s nutrition improves and recovers. With the information we have, we have determined the patient is moderately-severely malnourished in the context of chronic illness.

Nutrition Diagnosis

24.
NI 5.2 Malnutrition R/T chronic gastrointestinal disease resulting in malabsorption and decreased oral intake AEB 24% loss of body weight over 11 months, patient’s reports of decreased intake, patient c/o nausea, diarrhea and vomiting, and altered nutrition related lab values (decreased hemoglobin, calcium and magnesium, and blood proteins).

NC 1.4 Altered GI function R/T Billroth II surgery on 8/31 AEB tender and guarded abdomen, absence of bowel sounds, negative net I/O (-593 mL) since admission, and decreased magnesium, calcium, and hemoglobin.

25.
Enteral Nutrition (ND 2.1) *Jevity 1.2*

- Route (ND 2.1.6): Jejunostomy tube
- Schedule (ND 2.1.5): Continuous drip over 24 hours
- Rate (ND 2.1.3): Goal rate @ 67 mL/hr- initiate TF @ 25 mL/hr and advance as tolerated over the next 48-72 hours to reach goal
- Composition (ND 2.1.2): Total volume of 1487 mL/day, 1785 Kcal/day (36 kcal/kg), 83 g protein/day (1.6 g/kg), and 1200 mL free fluid/day
- Feeding tube flush (ND 2.2.7): 92 mL free fluid q 4 hours

Goal: Patient meets 100% of needs via tube feeding resulting in a 0.5-1.0# weight gain per week, lab values returning to normal limits indicating absorption and utilization, and tolerance of nutrients in the GI tract AEB absence of D/N/V and return of bowel movements.

Nutrition relationship to health/disease (E 1.4)

Goal: Patient understands how her digestive and absorptive capacity has changed as a result of her surgery and learns how to identify foods she may not tolerate as well once she begins eating.
- Provide meal and food suggestions that are high in complex carbohydrates and fiber and low in simple sugars
- Help the patient to understand the importance of small, frequent meals to prevent early satiety and to reduce dumping syndrome and other side effects of malabsorption
- Help the patient to understand the benefits of quitting smoking and reducing caffeine consumption in order to prevent the developments of ulcers in the future

27. The patient should be educated on how a healthy lifestyle will aid in her recovery and prevention of developing another ulcer in the future. The patient’s use of tobacco smoke is a concern, and the patient should be educated on the effects this habit has on her gastrointestinal tract and the risk it presents for the development of gastric and duodenal ulcers[2]. The patient’s large amount of coffee consumption is also a concern, and the registered dietitian should speak to the patient about the harmful effects large amounts of coffee and soft drinks have on the gastrointestinal tract and the increased risk for the development of stomach ulcers due to large consumption[2]. The patient also noted that she has not consumed very much since her diagnosis. It is possible the patient has developed a fear of eating certain foods, which has contributed to the severe weight loss over the 11 month time period. The registered dietitian should help the patient to understand the importance of following diet recommendations as solid foods are introduced and explain that many of the modifications are not permanent and eating should begin to normalize over the next few months as her gastrointestinal tracts adapts. However, the RD should also add that some alterations in diet such as decreased coffee and soda consumption should remain reduced to aid in the reoccurrence of an ulcer or GERD in the future.

Nutrition Services
September 3, 2014
8:00am

Assessment
M.R., a 38 year-old female, was admitted on 8/30 for a surgical consult for a perforated duodenal ulcer and underwent a gastrojejunostomy on 8/31. 11 months prior to surgery, the pt was diagnosed with GERD. 2 weeks ago a duodenal ulcer was diagnosed with generalized gastritis and the pt tested positive for H. pylori and a medication regimen was prescribed. Upon admission the patient presented pale, thin and distressed. A jejunostomy feeding tube was placed at the time of surgery and the patient is currently receiving continuous TF and expected to transfer to oral feedings in the next few days. The patient is a tobacco smoker.

Height: 5' 5"
Weight: 110#
BMI: 20.2 kg/m^2
IBW: 110#
%IBW: 100%
UBW (11 months prior to GERD dx): 145#
% UBW: 76% (moderate malnutrition)
% Weight Loss: 24% (Severe)

Nutritional Physical Assessment:
- Appearance: thin, pale, acute distress
- Abdomen: tender with guarding and absent BS

Nutrition Related Lab Values (9/3):
- Glucose ↑ (128 mg/dL)
- Mg ↓ (1.7 mEq/L)
- Ca ↓ (8.7 mEq/L)
- Albumin ↓ (3.3 g/dL)
- Pre-Albumin ↓ (14 mg/dL)
- Hgb ↓ 10.2 (g/dL)

Pertinent Vitals:
- Temp 102

Medications:
- On day 10 of 14: bismuth subsalicylate (525 mg 4 X daily), metronidazole (250 mg 4 X daily), tetracycline (500 mg 4 X daily)
- On day 10 of 28: omeprazole (20 mg 2 X daily)

Allergies: NKA

Nutrition Hx:

- Prior to admission- 8-10 cups of coffee/day, 1-2 12oz cans soft drinks/day,
- NPO admission-surgery

Current Nutrition: Continuous enteral TF via jejunostomy tube, Peptamen AF @ 25 mL/hr advancing to 50 mL/hr goal rate

- I/O indicate the pt is not receiving the prescribed EN

Estimated Energy Requirements (Mifflin-St Jeor, AF 1.0 IF 1.4): 1750-1819 kcal/day
Estimated Protein Requirements (1.5-2.0 g/kg/day): 75-100 g/day
Estimated Fluid Requirements (1 mL/kcal): 1689-1819 mL/day

Diagnosis

NI 5.2 Malnutrition R/T chronic gastrointestinal disease resulting in malabsorption and decreased intake AEB 24% loss of body weight over 11 months, patient's reports of decreased intake since diagnosis, patient c/o nausea, diarrhea and vomiting and altered nutrition related lab values (decreased hemoglobin, calcium and magnesium, and blood proteins)

NC 1.4 Altered GI function R/T Billroth II surgery on 8/31 AEB tender guarded abdomen, absence of bowel sounds, net I/O -593 since admission, and decreased magnesium, calcium, and hemoglobin.

Intervention

Enteral Nutrition (ND 2.1) *Jevity 1.2*
- Route (ND 2.1.6): Jejunostomy tube
- Schedule (ND 2.1.5): Continuous drip
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- Composition (ND 2.1.2): Total volume of 1487 mL/day, 1785 Kcal/day (36 kcal/kg), 83 g protein/day (1.6 g/kg), and 1200 mL free fluid/day
- Feeding tube flush (ND 2.2.7): 92 mL free fluid q 4 hours

Goal: Patient meets 100% of needs via tube feeding resulting in a 0.5-1.0# weight gain per week, lab values returning to normal limits indicating absorption and utilization, and tolerance of nutrients in the GI tract AEB absence of D/N/V

Nutrition relationship to health/disease (E 1.4)

Goal: Patient understands how her digestive and absorptive capacity has changed as a result of her surgery and learns how to identify foods she may not tolerate as well once she begins eating.
- Provide meal and food suggestions that are high in complex carbohydrates and fiber and low in simple sugars
- Help the patient to understand the importance of small, frequent meals to prevent early satiety

and to reduce dumping syndrome and other side-effects of malabsorption
- Help the patient to understand the benefits of quitting smoking and reducing caffeine consumption in order to prevent the developments of ulcers in the future

Monitor & Evaluation

Tolerance of tube feeding:

- I/O, abdominal distention, bowel sounds and movements, rapid increase or decrease in weight, electrolytes, Mg, Phosphorus, Potassium, and blood glucose

Weight Gain:

- Patient gain 0.5-1# per week while in the hospital

Return of GI function and tolerance

- Slowly transition from enteral nutrition to an oral diet beginning with tolerance of ice chips and progressing to liquids followed by easy to digest solid foods
- D/C tube feeding when the patient is able to meet >75% needs orally

Iron, B12, and folate status

- Evaluate hemoglobin lab values for further evidence of deficiencies
- Advise patient on the proper consumption and use of any prescribed supplements

Evaluate the patient's understanding of nutrition recommendations and diet/lifestyle changes

- Ask the patient to explain the suggested changes and ways she plans to implement them
- Assess barriers the patient perceives in making changes to her current diet and lifestyle

Signature:_____

Signature:_____

Signature:_____

Signature:_____

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