**Module 6 Case Study Assignment NHM 365-901**

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**A complicated case: GERD, PUD, and gastric surgery**

Maria Gomez is a 38-year-old female. Three weeks ago, an outpatient endoscopy revealed a 2cm duodenal ulcer with generalized gastritis and a positive biopsy for *Helicobacter pylori*. She was prescribed 10 days of treatment with the medicine sucralfate (Carafate) QID. She was also prescribed a 28-day treatment of tetracycline 500mg QID and omeprazole 20mg BID.

Five days ago, Mrs. Gomez was admitted to the hospital for symptoms of hematemesis and severe abdominal pain. The gastroenterologist diagnosed a perforated duodenal ulcer, and a gastrojejunostomy (Billroth II) was performed. A jejunostomy tube was placed during surgery, and she has been receiving continuous tube feeding. She explains that she has eaten very little since the ulcer was diagnosed, and she asks how long it will be before she can eat again. Her gastroenterologist discerns that she is now ready for a trial of food by mouth.

**DOB**: 2/15/1976

**Sex**: Female

**Education**: Associate’s degree

**Household members**: Widowed; lives with 2 daughters ages 12 and 14

**Chief complaint**: s/p gastrojejunostomy (Billroth II) surgery for perforated peptic ulcer

**PMH**: GERD, PUD

**Meds**: See history above. In addition, Mrs. Gomez reports that she took ibuprofen daily for back pain prior to her diagnosis of PUD, but her physician told her to stop taking ibuprofen when the duodenal ulcer was diagnosed. She also reports frequent intake of calcium carbonate (Tums) prior to admission for “indigestion.”

**Smoker**: Yes

**ETOH**: None

**Family Hx**: PUD – father and grandfather

**Vitals**: Temp 101.5° F, pulse 68, RR 32 bpm, BP 110/70 mm Hg

**Ht**: 5’2”

**Wt**: 110 lbs

**Abdomen**: Tender with guarding; bowel sounds present

**Previous MNT**: None

**Usual diet prior to admission:**

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| --- | --- |
| **Meal** | **Food/beverage** |
| Breakfast | * Coffee * Toast with Nutella chocolate spread |
| Lunch | * Sandwich at home (lunchmeat and cheese on whole wheat bread with mayo and mustard) * Canned fruit cocktail * Large bowl of mint chocolate chip ice cream * Sweetened iced tea |
| Dinner | * 2 cups of rice * Some type of meat * Steamed vegetables with garlic and onions * Sweetened iced tea |
| Usual intake includes ~8-10 cups of coffee and 1-2 canned soft drinks daily.  The pt reports that she avoids fried foods because “they aggravate my acid reflux.” | |

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**Biochemical data:**

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| **Lab** | **Result** | **Normal Range** |
| Sodium (Na+) | 138 mEq/L | 135-147 mEq/L |
| Potassium (K+) | 3.7 mEq/L | 3.5 to 5 mEq/L |
| Chloride (Cl-) | 99 mEq/L | 95-105 mEq/L |
| Carbon dioxide | 25 mEq/L | 21-30 mEq/L |
| Blood urea nitrogen (BUN) | 18 mEq/L | 8 to 23 mg/dL |
| Creatinine | 1.2 mg/dL | 0.8 to 1.4 mg/dL |
| Glucose | 99 mg/dL | 70-110 mg/dL |
| Magnesium | 2.1 mEq/L | 1.8-3.6 mEq/L |
| Phosphorus (PO4) | 3.5 mg/dL | 3.0-4.5 mg/dL |
| Albumin | 3.3 g/dL | 3.5–5 g/dL |
| Prealbumin | 15 mg/dL | 16-35 mg/dL |
| WBC (x 103/mm3) | 13.2 | 4.8-11.8 |
| RBC (x 103/mm3) | 5.0 | 4.2-5.4 (female) |
| Hemoglobin | 10.2 g/dL | 12-15 g/dL (female) |
| Hematocrit | 33% | 37-47% (female) |
| Mean cell volume | 86 μm3 | 80-96 μm3 |

1. Based on the information provided, identify 3 risk factors this patient had for developing PUD.

***H*. *pylori* infection** – found to be the most common cause of peptic ulcer disease.

Previous **chronic use of NSAIDs** – multifactorial risk for peptic ulcers: reduction in gastric mucosal blood flow; suppression of gastric prostaglandin synthesis, which diminishes the gastric mucosal defense mechanism against irritants; and topical damaging-effect of NSAIDS to the stomach’s epithelium.

**Smoking** – is also a factor which interferes with the defenses of the gastric mucosa: it reduces prostaglandin production in the stomach’s mucosa; it stimulates basal acid output; it increases bile salt reflux and concentration; and it impairs ulcer healing by inducing a decrease of the mucosal cell renewal process.

1. What role does *H. pylori*, play in PUD?

*H. pylori* is a common **disruptor of the mucosal integrity of the stomach**. *Helicobacter pylori* is a gram-negative bacteria which resists the acidic pH of the stomach thereby being able to flourish and infect the individual; furthermore, the infection induces an inflammatory response in the host in which the expression of proinflammatory cytokines inhibits the host’s immune response further contributing to the persistence of the infection. Infection with *H. pylori* will produce irritation and inflammation of the stomach’s lining (gastritis) and will also damage it allowing for the stomach acid to create an open sore (ulcer) in it.

1. Calculate and interpret this patient’s BMI (*Use the metric formula, show your work, and round your final answer to 1 decimal place.*)

Weight: 110 lbs = **49.486 kg** (by multiplying by 0.4536)

Height: 5’2” or 62 in = **157.48 cm** (by multiplying by 2.45)

BMI: 49.486 kg / (1.5748 m2) = 20.1192 **BMI: 20.1 kg/m2, which is normal.**

1. Calculate her %IBW. (*Show your work.*)

***Hamwi* formula for women**: 100 lbs + (5 lbs per in > 60 in)

= 100 + (5 x 2) = 100+ 10= **110 lbs \*** Assumes she is of medium build

***%IBW***

IBW 110 =  100%

CBW 110 X X = 100 % This means **she is at her Ideal Body Weight**

1. Prior to being diagnosed with GERD last year, Mrs. Gomez weighed 145 lbs. Calculate her %UBW and her % weight change. In light of all of your calculations (BMI, %IBW, %UBW, and % wt change), which of these is the most pertinent to identify the patient’s nutritional risk? Justify your answer. (Show your work for calculations.)

**%UBW**

% UBW = (100 x Actual Weight) / UBW

= (100 x 110) / 145 = 75.86 **She is at about 75 % of her Usual Body Weight**

**% Weight Change over 1 year period**

= UBW – CBW X 100

UBW

= [(145 – 110) ÷ 145] x 100 = 24.13

**Her weight has changed by 24% over the last year**

The most pertinent calculation to assess the patient for nutritional risk is the % weight change. It is to be noted that this decrease in weight was unintentional. Unintentional weight loss is the most useful parameter for nutritional risk (malnutrition). Her weight loss of 24 % in one year could be equated to weight-loss of 10% or more in six months. The BMI and IBW are useful calculations of weight status but are more generalized and are not individualized to the patient’s weight history.

1. The physician advised Mrs. Gomez to stop taking ibuprofen after her diagnosis of PUD. Why?

Ibuprofen belongs to a class of drugs called Non-Steroidal Anti-Inflammatory Drugs (**NSAIDs**). This type of medications have various effects on the body that will both disrupt the stomach’s natural ability to protect itself from irritants, and will damage the gastroduodenal mucosa. Some of those effects are: reduction in gastric mucosal blood flow; suppression of gastric prostaglandin synthesis (prostaglandins inhibit acid secretion and stimulate mucus and bicarbonate secretion), thereby diminishing the gastric mucosal defense mechanism against irritants; and topical damaging-effect of NSAIDS to the stomach’s epithelium. Chronic and long-term use of NSAIDs is a cause for the pathophysiology of peptic ulcers, and their use should be discontinued, as her doctor recommended.

1. Mrs. Gomez had previously been self-medicating with Tums for relief of her GERD. How does this medication (calcium carbonate) relieve the s/s of GERD?

Calcium Carbonate CaCO3 is abasic inorganic salt compound that acts by quickly buffering (neutralizing) the acid in the stomach and esophagus, bringing **temporary relief** to the symptoms of GERD such as acid taste, burning sensation, and belching.

1. The table below lists the medications that Mrs. Gomez was prescribed for treatment of her PUD. Complete the table with the mechanisms of action and any possible drug-nutrient side effects.

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| **Drug** | **Action** | **Nutrition-related side effects or drug-nutrient interactions** |
| **sucralfate** | Sucralfate is a gastric mucosa **protectant.** It binds to duodenal and gastric ulcers and to gastric erosions, as well as to uninjured mucosa. It also buffers acid, inhibits the action of pepsin, and adsorbs bile salts. | Should not be taken at the same time with Ca or Mg supplements or anti-acids, wait at least 30 min  High Al content  Delayed gastric emptying, may cause bezoar formation due to protein-binding qualities  May cause constipation, cramps |
| **omeprazole** | Omeprazole is a **Proton Pump Inhibitor**. PPI’s are potent inhibitors of acid secretions. They are prodrugs converted to sulfenamide by the presence of the gastric acid, then bind to cysteine residues of the H+/K+-ATPase pump (irreversibly blocking it), which is the terminal phase of the acid secretion by the parietal cells of the gastric lining. | Causes decreased Ca absorbance by 61%  Ca citrate supplementation is advised  Decreased absorbance of other drugs  Avoid intake of gingko or St. John’s Worth and alcohol  May cause nausea, abdominal pain, diarrhea  Possible decreased Vitamin B12 |
| **tetracycline** | Tetracycline is a broad spectrum **antibiotic.**   They bind to the [30S ribosomal subunit](http://en.wikipedia.org/wiki/30S_ribosomal_subunit) in the [mRNA translation](http://en.wikipedia.org/wiki/MRNA_translation) complex of the bacterial organism, thereby inhibiting their protein synthesis. | Take one hour before or 2 hr after food or milk  Ca, Fe, Mg, Zn, or Multivitamin with minerals should be taken 3 hr before or 1 hr after drug due to possible chelation  Avoid St. John’s Worth  Avoid Vit A supplementation  May cause decreased Vit K  May cause anorexia, stomatitis, oral candidiasis, esophagitis, dysphagia, nausea, vomiting, cramps, and diarrhea |

1. Explain the surgical procedure this patient received.

The **Billroth II** surgical procedure is in essence a **gastrojejeunostomy** intestinal anastomosis. In this procedure a gastrectomy is first performed, removing the antrum and a good portion of the distal stomach; then the remaining stomach is attached to a loop of the jeujunum to allow for the flow of food. The remaining duodenum is sutured and left as a stump which will continue to receive the flow of bile and pancreatic enzymes.

1. The most common physical side effect from this surgery is Dumping Syndrome (stomach contents “dump” too quickly into the small intestine). What are some s/s of dumping syndrome?

Dumping Syndrome is a complex GI and vasomotor response with various signs and symptoms. In the **early stage** (about 10-20 min after a meal) a patient may experience: abdominal fullness; nausea, and or vomiting; abdominal bloating, and pain; even explosive diarrhea. In the **late stage** (about 1-2 hrs after a meal patients may experience: perspiration, flushing, palpitations, faintness, weakness, anxiety, and need to lie down.

Late stage symptoms are characteristic of a **reactive hypoglycemic** response.

1. As the patient resumes oral intake, her diet is advanced from sugar-free clear liquids to lactose-free full liquids, to soft/low-residue solids, to DAT. As the patient resumes solid foods, describe appropriate dietary guidelines to prevent Dumping Syndrome.

* Small, more frequent meals
* High-protein and moderate fat foods are recommended
* Less solid, more crushed foods
* Limited fluids during meals, waiting to drink until after meal, in small quantities
* Fewer simple sugars (hypertonic, concentrated sweets)
* More complex carbohydrates, more soluble fiber
* Lactose as in milk and ice cream may need to be avoided
* Lying down and avoiding physical activity for 1 hr after eating
* The focus is to avoid rapid GI transit and promote slow GI transit

1. Why might a person be at risk for iron-deficiency anemia, pernicious anemia, and/or megaloblastic anemia following this surgical procedure?

**Iron-deficiency anemia** – Due to **decreased HCl**, the conversion of Fe to its ferrous form for absorption is hindered, also rapid transit and diminished contact of dietary Fe with absorption sites may cause it.

**Pernicious anemia** – Due to **decreased Intrinsic Factor** production in the stomach, enough quantities needed for Vitamin B12 absorption may not be available.

**Megaloblastic anemia** – **Folate deficiency**. Folate requires Vitamin B12 for its activation and absorption; if Vitamin B12 is not adequate folate is trapped inside the cells in its methyl form and becomes unavailable for DNA synthesis of red blood cells.

1. As Mrs. Gomez resumes a normal diet, identify 3 modifications that could be made to her usual diet for better management of GERD?

* She is a coffee drinker and this needs to be changed as caffeine is a main factor that causes GERD symptoms. Maybe decaf tea could be had with Splenda, and in small quantities through the day to also prevent Dumping Syndrome.
* Chocolate is also an aggravating factor for GERD symptoms so her toast with Nutella could be substituted for toast with peanut or almond butter.
* She reports drinking carbonated drinks and these also should be avoided as these may cause belching and other GERD symptoms.

1. Review Mrs. Gomez’s lab values, and identify any biochemical measures that are out of range. Provide a possible explanation for each abnormal lab value.

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| **Lab** | **Result** | **Normal Range** | **Interpretation** |
| **Albumin** | 3.3 g/dL | **3.5–5 g/dL** | **Abnormal** |
| **Prealbumin** | 15 mg/dL | **16-35 mg/dL** | **Abnormal** |
| **WBC (x 103/mm3)** | 13.2 | **4.8-11.8** | **Abnormal** |
| **Hemoglobin** | 10.2 g/dL | **12-15 g/dL (female)** | **Abnormal** |
| **Hematocrit** | 33% | **37-47% (female)** | **Abnormal** |

Albumin- Possible **malnutrition**; lack of amino-acids available for protein synthesis.

Pre-albumin- Possible **malnutrition**.

White Blood Cell count- Possible **infection**; also seen in trauma or stress; and **dehydration**.

Hemoglobin- Possible **anemia**; dietary deficiency.

Hematocrit- **Anemia**, hemolytic anemia; dietary deficiency.

1. Upon admission, Mrs. Gomez presented with hematemesis. What does this mean? List 2 other s/s of PUD.

Hematemesis means **vomiting of blood** or **blood in the vomit**; usually red bright blood indicate rapid **upper GI bleeding**, commonly associated with a peptic ulcer.

Other signs and symptoms of PUD are:

* + - Epigastric pain
    - Burning sensation that is temporarily relieved by anti-acids or eating
    - Other s/s: anorexia, nausea, vomiting, weight loss, and melena if perforation occurs.
    - Some patients may be asymptomatic

1. As Mrs. Gomez’s diet is advanced, she experiences steatorrhea. What is steatorrhea? What does this signify?

Steatorrhea is **fat in the stool** in greater than normal amounts. This signifies that dietary fat is not being absorbed properly.

1. Select 2 nutrition problems, and write a PES statement for each.

**Malnutrition** (NI-5.2) related to previous PUD, and Billroth 2 procedure performed, as evidenced by: lower than normal Prealbumin and Albumin values; patient self-report of reduced dietary intake since PUD was diagnosed (three weeks prior to admission); and significant unintended weight-loss in the past year.

**Altered GI function** (NC-1.4) related to Billroth 2 procedure performed, as evidenced by: altered nutrition-related lab values suggesting anemia and malnutrition; and steatorrhea.

1. For each PES statement, identify and ideal goal. Describe an appropriate intervention to meet each goal. (*Be specific. For example, if your intervention includes nutrition education, describe the type of education that you will provide.*)

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| PES Statement | Goal | Intervention |
| **Malnutrition** (NI-5.2) related to previous PUD, and Billroth 2 procedure performed, as evidenced by: lower than normal Prealbumin and Albumin values; patient self-report of reduced dietary intake since PUD was diagnosed (three weeks prior to admission); and significant unintended weight-loss in the past year. | Improve nutrition status to stop malnutrition  Maintain IBW | Provide patient with education about malnutrition and anemia; and steps for her to follow to allow for MNT of these conditions  Ensure caloric intake does not fall below EER;  provide patient with a couple of weekly sample diet plans that address her caloric and post-operative needs, as well as a list of nutrient-rich snacks that are appropriate for her “new” GI anatomy and physiology |
| **Altered GI function** (NC-1.4) related to Billroth 2 procedure performed, as evidenced by: altered nutrition-related lab values suggesting anemia and malnutrition; and steatorrhea. | Improve GI function/nutrient utilization | Iron, folate and Vitamin B12 supplementation.  MCT oil supplementation (incorporated into foods for better utilization) |

1. Based on the s/s of your PES statements, identify 3 things you will monitor/evaluate at a follow-up visit.

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| --- | --- |
| PES Statement | Monitoring and Evaluation |
| **Malnutrition** (NI-5.2) related to previous PUD, and Billroth 2 procedure performed, as evidenced by: lower than normal Prealbumin and Albumin values; patient self-report of reduced dietary intake since PUD was diagnosed (three weeks prior to admission); and significant unintended weight-loss in the past year. | Reassess nutrition-related lab values in 3 months; have labs taken 3 days prior to follow up appointment  Monitor weight at 3 month follow up appointment, evaluate for gain/loss  Evaluate patient’s response/adherence to suggested meal plan |
| **Altered GI function** (NC-1.4) related to Billroth 2 procedure performed, as evidenced by: altered nutrition-related lab values suggesting anemia and malnutrition; and steatorrhea. | Reassess nutrition-related lab values in 3 months; have labs taken 3 days prior to follow up appointment  Monitor for continued steatorrhea (as reported by patient)  Assess patient’s adherence and response to vitamin, mineral and MCT supplementation |