Case Study #1: Gastrointestinal Disease
Due 1/28/13
50 points

Case A
Present illness: GA is a 29 yo F with GERD. She is 5'1" and weighs 130 lbs. Her UBW is 148 lbs. She denies trying to lose any weight.
CC: Chronic indigestion and increased epigastric pain; black tarry stools x six days.
Endoscopy revealed two cm duodenal ulcer and generalized gastritis. Biopsy positive for
Helicobacter pylori.
Dx: Bleeding duodenal ulcer
Medications: Bismuth subsalicylate – 525 mg qid x 14 d
              Metronidazole – 250 mg qid x 14 d
              Tetracycline – 500 mg qid x 14 d
              Omeprazole – 20 mg bid x 28 d

Labs:		
	Total protein	5.9 g/dL
	Albumin	3.2 g/dL
	Prealbumin	22 mg/dL
	Hgb	10.5 g/dL
	Hct	34%
	Ferritin	9 µg/L
	WBC	9000/mm^3

1. **1. What is *Helicobacter pylori* and how does it relate to the duodenal ulcer? (2 points)**

Helicobacter pylori is a gram negative bacteria found in the stomach that colonizes beneath the mucosa layer and commonly the upper GI tract. This bacteria is considered a very common cause of peptic and gastric ulcers because it causes chronic inflammation of the inner lining of the stomach, and produces urease Helicobacter lesions in the stomach.
NTP pg. 361, 573

2. **What is the significance of the dark-colored stools? (1 point)**

The black, tarry stools are signs that there is internal bleeding in the upper intestines, leading to oxidized blood in the stool. The stool is also a sign that the patient has peptic ulcer disease.

3. **How does each of the prescribed medications work? Are there any drug-nutrient interactions that need to be addressed? (4 points)**

Bismuth Subsalicyate: antidiarrheal agent that works by decreasing flow of fluids and electrolytes into bowel. Reduces inflammation within the intestine. Used to treat GERD and in conjunction with other drugs to treat GA's ulcer caused by H. pylori. Cytoprotective agent.
Metranoidazole: an antibacterial and antiprotozoal nitromidazole used to fight bacteria helicobacter pylori by disturbing DNA synthesis in bacteria. GA must not drink alcohol while taking this drug.
Tetracycline: used to treat bacterial infections such as helicobacter pylori by inhibiting protein synthesis. GA must drink a full glass of water each time they take this. GA should not take this with food- especially dairy products such as milk, yogurt, cheese and ice cream. Antacids, calcium supplements, iron products, and laxatives containing magnesium decrease the effectiveness of tetracycline.
Omeprazole: Proton pump inhibitor. Works by decreasing the amount of HCl made in the stomach, used to treat GERD. May decrease Fe and Vitamin B12 absorption and cause diarrhea. GA must limit high calcium foods when taking this drug.
* nlm.nih.gov, NPR online pg. 76, 81.

4. **Compare GA's current lab values with the normal values and describe how each relates to her diagnosis. (3 points)**

Lab Values	GA's values	Normal Values	Interpretation
Total Protein	5.9 g/dL	6.4-8.3g/dL	Low- protein deficiency
Albumin	3.2 g/dL	3.5-5.0g/dL	Low – protein deficiency
Prealbumin	22 mg/dL	13-36mg/dL	Normal
Hgb	10.5 g/dL	12-16 g/dL	Low: anemia
Hct	34%	37-47%	Low: anemia
Ferritin	9 µg/L	10-150 µg/L	Low
WBC	9,000/mm³	5,000 – 10,0000mm	Normal- high end

NPR online pg. 40, NTP pg. A-90, A-93

5. **Write an appropriate PES statement for one of the patient's nutrition problems. (3 points**

Unintended weight loss (N.C.3.2) R/T chronic indigestion AEB black tarry stools, biopsy positive for helicobacter pylori and 12% weight loss with patient denial of intentional weight loss (N.C.2.2).

NPR pg.150

Case B-
Present illness: MT is a 56 yo M with a long history of alcoholism. He has recently been diagnosed with cirrhosis and portal hypertension. He reports poor appetite with limited po intake. He is 5'8" and weighs 170 lbs. His UBW is 180 lbs.

CC: Fatigue, nausea and early satiety.
Dx: Cirrhosis and portal hypertension
Labs:

Na:	**120 mEq/L**
K:	**5 me/L**
Cl:	**96 mEq/L**
BUN:	**24 mg/dL**
Glucose:	**108 mg/dL**
CO$_2$:	**25 mEq/L**
Cr:	**0.7 mg/dL**
Albumin:	**2.3 g/dL**
AST:	**87 U/L**
ALT:	**48 U/L**

1. **Compare MT's current lab values with the normal values and describe how each relates to his diagnosis. (3 points)**

Labs:	MT's	Normal	Interpretation	Relation to Dx
Na	120 mEq/L	136-145 mEq/L	Low	Electrolyte imbalance
K	5 me/L	3.5 – 5.0 me/L	Borderline high	Electrolyte imbalance
Cl	96 mEq/L	98-106 mEq/L	Low	Electrolyte imbalance
BUN	24 mg/dL	10-20 mg/dL	High	High protein breakdown and/or dehydration
Glucose	108 mg/dL	65-99 mg/dL	High	Hyperglycemia- indicative of ascites
CO2	25 mEq/L	23-30 mEq/L	Normal -> low	Possibly indicative of muscle wasting
Cr	0.7 mg/dL	0.6 – 1.2 mg/dL	Normal/ borderline low	Possibly indicative of muscle wasting
Albumin	2.3 g/dL	3.5 – 5.0 g/dL	Low	Low blood proteins
AST	87 U/L	14-20 U/L	High	Liver damage
ALT	48 U/L	4-36 U/L	High	Liver damage

NPR online pg. 35-40, NTP A-90

2. Write the assessment portion of the ADIME note. Please include a brief discussion regarding your choice of equations to estimate nutritional needs. (6 points)

MT, male alcoholic dx with cirrhosis and portal hypertension. Patient reports poor appetite, fatigue, nausea, early satiety and limited PO intake.

Assessment	Lab Values	Requirements
MT, male 56 y/o Height: 5'8, 172.72 cm, 1.73m CBW, 170#, 77.27kg UBW: 180#, 81.82kg %UBW: 94% IBW: 154# (70.00kg) IBW range: 144#-164#, (65.45kg-74.55kg) %IBW: 110% BMI: 25.88 (overweight) – possibly due to ascites	Na: 120 mEq/L K: 5 me/L Cl: 96 mEq/L BUN: 24 mg/dL Glucose: 108 mg/dL CO2: 25 mEq/L Cr: 0.7 mg/dL Albumin: 2.3 g/dL AST: 87 U/L ALT: 48 U/L	Energy: 2,109.49-2,260.17 kcal/day* Fluids: 2,109.49-2,260.17 mL/day Protein: 83.82 – 104.78 g/day

* Used Mifflin- St. Jeor: most accurate equation for overweight and obese individuals (NPR online pg. 3)
* Used AF 1.4-1.5 (Seated work w/requirement to move because activity not indicated and brief patient history indicative of little activity) (NPR online pg. 9)
* Protein requirements based on moderate depletion (NPR online pg. 10)
* NTP pg. 40, A-90

3. List the interventions you would recommend for this patient. (5 points)

Increase colloid osmotic pressure by:

1. Encourage oral protein intake (1.0-1.5g/kg/day)
2. Restrict dietary sodium (2g/day)
3. Replenish with adequate kcals (35-40 kcals/kg/day)
4. Take Vitamin and mineral supplement including (B complex, C, D, K, Zinc, Magnesium, Phosphorus)
5. Abstain from further alcohol consumption

NTP pg. 459

4. Which parameters would you monitor to assess the efficacy of your interventions? (2 points)

Blood glucose levels
Monitor food via food log
Vitamin and mineral deficiencies (Vitamin B complex, C, D, K, Zinc, Magnesium, Phosphorus)
Anemia lab values
Weight changes
Fluid retention (edema)
Na, Cl, and K for electrolyte and fluid balance.

NTP pg. 456-459

<u>Case C</u>
Present illness: JB is a 21 yo F currently attending UC Davis. She is a swimmer for the UC Davis swim team and trains extensively throughout the year. She is 5'5" and weighs 52 kg. Her UBW is 130 lbs

CC:" I have lost 15 pounds in the past 1-2 months. My stomach hurts a lot, especially after eating. I have been having terrible diarrhea. I don't have the energy I used to. I can't keep up with my swim team training or my school work."
Patient Hx:

Onset of disease: JB is a previously healthy female with no known medical history. Denies family history of gastrointestinal disease but reports that her mother and grandmother have "funny stomachs" and have had diarrhea off and on for most of their adult lives. Over the past six weeks however JB reports she has developed abdominal pain, bloating and loose frequent stools. She reports that she feels very tired lately and is having trouble keeping up with her swim training. She reports that during this time she has been losing weight, approximately 15 pounds in the past 1-2 months. She also reports that she has stopped menstruating.

Physical Examination:
General appearance: thin, very pale appearing female who c/o fatigue, abdominal pain and diarrhea
Abdomen: slightly distended, bowel sounds present
Intestinal Biopsy results indicate flat mucosa with villus atrophy.

Medications: Daily oral birth control

Laboratory values:
> **Albumin: 3.0g /dl**
> **Prealbumin: 14 mg/dl**
> **Sodium: 137 mEq/L**
> > **Potassium: 3.6 mEq/L**
> > **Chloride: 100meq/L**
> **Phosphorous: 3.6mg/dl**
> **Magnesium: 1.8mg/dl**
> > **Glucose: 75mg/dl**
> > **BUN: 10mg/dl**
> > **Creatinine: 0.7mg/dl**
> > **Calcium: 7.9mg/dl**
> > **Iron: 15 mcg/L**
> > **Vitamin D 25 OH: 25 nmol/L**
> > **AGA antibodies: +**
> > **EMA antibodies: +**
> > **RBC: 4.9 million cells/ml**
> > **Hct: 32%**
> > **Hgb: 9.0g/dl**
> > **MCV: 65.3mcg^3**
> > **MCHC: 26.4g/dl**
> > **Transferrin: 2.0gL**
> > **Ferritin: 8 mcg/L**

Nutrition Hx:
JB states that she has felt very hungry lately but that reports that when she eats large amounts of food she has abdominal pain and diarrhea almost immediately. She notes that fried and fatty foods and dairy products, particularly milk and ice cream, tend to make the diarrhea worse. As a result she has been avoiding these foods and not eating very much because she is afraid of having diarrhea at school.

24 hour recall:
Brk: 2 slices whole wheat toast with 1 tsp butter, 8oz hot tea with 2 tsp sugar.
Lunch: Turkey sandwich (2 slices whole wheat bread, 4 slices turkey lunchmeat, 1 leaf lettuce, no cheese, no mayo or mustard), ½ cup applesauce, 8-10 plain baked potato chips, 12 oz lemon lime soda.
Snack: 1 cup dry cereal (cheerios or wheat Chex), 1 banana, sips of lemon lime soda or water
Dinner: 1 cup chicken noodle soup, 5-6 saltine crackers, 12oz lemon lime soda
Food allergies: none noted

Social:
JB lives in an off campus apartment with 2 female roommates. She prepares her own food but shares kitchenware and dishes with her roommates.

Dx: Celiac disease with secondary malabsorption and anemia.

Case Questions:
1. What are AGA and EMA antibodies? Briefly explain the connection between the positive result of these tests and celiac disease. (2 points)

AGA (Anti-gliadin antibodies of the IgG and IgA class) are produced in response to gliadin, which is a prolamin found in wheat. This antibody is a diagnostic factor for celiac disease.

EMA (anti-endomysial antibody) is an anti-transglutaminase antibody (ATA) of the IgA class that reacts in response to the transglutaminase protein. High levels of ATA's are found in patients with celiac disease, as this is also a diagnostic factor for celiac disease.

NTP pg. 402-403

2. How do the other lab results (specifically vitamin D and anemia related blood tests) relate to the diagnosis of celiac disease? What other nutrition related labs might you want to check? (2 points)

When taking gluten, celiac disease (gluten-sensitive enteropathy) yields an inflammatory response due to the bodies adverse reaction to gliadin. This response results in damage to the villi of the small intestine. Because healthy villi on the lining of the small intestine is essential to allow nutrients from food to be absorbed into the bloodstream, damaged villi results in malabsorption of these nutrients. Thus, someone with celiac disease would have significantly lower levels of Vitamin D and anemia related blood tests, because the body will not readily absorb essential vitamins and minerals. Other important nutrition related lab values we might want to check are albumin, fat soluble vitamins A,D, E, K, and the B-complex vitamins. Additionally, it is important that we check the minerals calcium and folate.

3. Patients with celiac disease are often lactose intolerant prior to dx and remain temporarily lactose intolerant following adherence to a gluten free diet, though this often resolves over time. Explain why this occurs. (2 points)

Due to the damaged villi from gluten in celiac disease, the enzyme lactase (which breaks down lactose) is produced in smaller amounts. Thus, those on diets including gluten that have an adverse reaction to gluten are continually damaging the villi. This resolves over time because, when the patient begins to follow a gluten-free diet, it still takes time for the damaged villi to repair itself. Acute villi can repair itself within 5-7 days, however, it may take months for the damaged villi to fully repair, and in this time, the enzyme lactase is not being produced in sufficient amounts to digest lactose.

4. Write a complete ADIME note including all necessary components. Please include your calculations on a separate sheet of paper. (15 points)

A: JB, 21 y/o female, c/o fatigue and stomach pain. Family hx of GI upset and diarrhea. Patient reports abdominal pain, bloating, diarrhea, weight loss and lack of menstruation over past 1-2 months.

Anthropometric	Lab values	Current Diet Analysis
JB, Female Age: 21 y/o CBW: 52 kg, 114.4# UBW: 58.97kg, 130# Height: 5'5, 165.1cm, 1.65m BMI: 19. 05 (borderline underweight) IBW: 56.69kg, 125# %IBW: 92% %UBW: 88%	Albumin: 3.0 g/dl Prealbumin: 14 mg/dl Sodium: 137 mEq/L Potassium: 3.6 mEq/L Glucose: 75 mg/dl BUN: 10mg/dl Creatinine: 0.7mg/dl Calcium: 7.9 mg/dl Iron: 15 mcg/L Vitamin D OH: 25 nmol/L AGA antibodies: + EMA antibodies: + Hct: 32% Hgb: 9.0g/dl MCV: 65.3 mcg MCHC: 26.4g/dl Transferrin: 2.0gL Ferritin: 8mcg/L	Energy: 1287 kcals Protein: 45g, (14% kcals) Carbs: 240g (75% kcals) Total fat: 14% kcals Calcium: 320mg Potassium: 1558mg Magnesium: 220 mg Phosphorus: 691 mg Vitamin D: 1 ug Vitamin A: 338 ug

Requirements
Energy: 1,867.89 – 2,001.32 kcals/day Fluids: 1,867.89 – 2001.32 mL/day Protein: 56.69- 68.03 g/day CHO: 256.83– 275.18 g/day (55% Kcals)

- Mifflin St. Jeor for energy requirements. Used AF of 1.4-1.5 for seated work little movement-student lifestyle. NPR online pg. 10
- Protein requirements based on mild depletion (NPR online pg.10)

  NPR online pg. 35-40

D: Unintended weight loss (N.C.3.2) R/T malabsorption of nutrients AEB 12% weight loss in past 2 months without patient intent, Hct: 32%, Hgb: 9.0 g/dl indicative of anemia (N.C.2.2).

I: **Recommendations**: Teach to read food labels. Avoid gluten in foods (wheat, rye, oat, and barley), teach use of other starches (corn, potato and other tubers, rice, legumes/soy, tapioca, millet, and amaranth). Look for hidden sources of gluten in the form of hydrolyzed vegetable protein, modified starch, soy sauce, and salad dressings. Begin taking a Multi-Vitamin supplement. **Goals:** Tonight, review list of all written forms of gluten on retail food packaging. Tomorrow, go to local grocery store with list and purchase a variety of gluten-free products and multi-vitamin containing iron. Starting tomorrow, keep a food journal daily. Within the next week, download a smart phone app to recognize gluten-containing products.

M/E: **Monitor**: Weight through weigh-ins at weekly appointments. Nutrient levels through extensive laboratory tests at next appointment. Compliance with gluten-free diet through patient report and food log. **Follow up/Evaluation**: Next appointment one week from today. For first two months, meet every two weeks and take lab tests each to monitor acute villi damage and nutrient absorption. Change diet or multivitamin mineral supplement as needed based on lab results and patient report.