

## Digestion, Endocrine Case Study

# Case Study

## Bella B. Aiken Doesn't feel so well

---

### Part I—Trouble Sleeping Prompts an Urgent Doctors Appointment

#### Scenario

Bella woke up with a terrible pain in her abdomen and a throbbing headache. Her wrist also hurts constantly and she doesn't know why. She can't stand it anymore and so she makes an appointment with her doctor. Not only has this headache getting worse, but it seems to be affecting her vision. Also, she has sure been thirsty. She just finished another water bottle (it has been about 4 just this morning). Her doctor is concerned and he begins his workup.

#### Examination

<b>Vital Signs</b> <ul style="list-style-type: none"><li>• Age: 41 years old</li><li>• Weight: 120 lbs</li><li>• Height: 5' 6"</li><li>• Temperature: 36.9°C</li><li>• Pulse: 90 beats/minute</li><li>• Respirations: 16 breaths/minute</li><li>• Blood Pressure: 126/75 (systolic/diastolic) mmHg</li></ul> <b>General Appearance</b> <ul style="list-style-type: none"><li>• Skin is warm and moist</li><li>• Looks fatigued</li></ul> <b>Head and Neck</b> <ul style="list-style-type: none"><li>• Bitemporal hemianopsia (blindness in her lateral visual fields)</li></ul>	<b>Lungs</b> <ul style="list-style-type: none"><li>• Normal</li></ul> <b>Cardiovascular</b> <ul style="list-style-type: none"><li>• Normal</li></ul> <b>Abdominal / GI</b> <ul style="list-style-type: none"><li>• Pain that is most severe in the upper abdominal area</li><li>• The patient admits to being nauseous and sometimes sees blood in her vomit.</li><li>• Persistent Diarrhea. Sometimes, blood is found</li><li>• Moderate Steatorrhea</li></ul> <b>Musculoskeletal</b> <ul style="list-style-type: none"><li>• An X-ray reveals a small hairline fracture in the right scaphoid bone</li></ul>
---	--

#### Physician Comments:

There is a significant weight loss (28 lbs.) from her last appointment (10 months ago). Also, the patient reports having no appetite. A blood chemistry, thyroid, and endocrine test are ordered. A follow-up appointment is arranged for the next week to review the blood lab results.

## Part II—The Follow-up Visit

---

### Scenario

Bella has been on “pins and needles ” the past week waiting for her blood results. Finally, the doctor knocked, entered the examination room, and pulled a stool over to Bella. He sat down next to her and opened the manila folder labeled “Blood Results.”

**Table 1**

Blood Lab Results	Result	Reference Range
Osmolality:	240 mOsm/Kg water	275-295 mosm/Kg water
Urea nitrogen:	5 mmol/L	2.5-7.1 mmol/L
Calcium:	13 mg/dl	8.5-10.2 mg/dl
T <sub>3</sub> -total:	60 ng/dl	80 – 200 ng/dl
T <sub>4</sub> -total:	2.3 ug/dl	4.5 – 11.7 ug/dl
TBG:	7 mg/dl	10 – 24 mg/dl
TRH:	35 U/ml	5 - 25 U/ml
TSH:	0.2 mU/L	0.4 – 4.0 mU/L
TSI:	0.01 U/L	0.00 – 0.55 U/L
PRL	55 ng/ml	2 – 29 ng/ml
ACTH:	3.4 pg /ml	9 – 46 pg/ml
GHRH:	14 pg/ ml	4 – 12 pg/ml
GH:	Absent	.01 - 3.61 ng/ml
PTH:	100 pg/ml	10 – 65 pg/ml
GnRH:	22 pg/ml	0 – 10 pg/ml
LH:	0.3 mIU/ml	1.5 – 18 mIU/ml
FSH	0.7 mIU/ml	1.5 – 18 mIU/ml

The doctor mentions that he needs to do more tests to confirm a suspicion that he has about her digestive symptoms. The tests and examination procedures on the following page are performed:

**Table 2**

<b>Test</b>	<b>Result</b>	<b>Reference Range</b>
Upper gastrointestinal endoscopy	duodenal ulcer found	
Basal rate of gastric HCL secretion	12 mmol/hr	1-5 mmol/hr
Serum Gastrin Level	1145 pg/ml	50 – 100 pg/ml
Gastric Fluid Removal *When gastric juice is removed via a nasal gastric tube over 24 hour period	Diarrhea is corrected during the 24 hours	
Endoscopy Biopsy of Gastric Fundus	Gastric glands are more numerous with an elevated density of parietal cells	
Test Meal *Patient is given a test meal and then Gastrin levels are monitored	No increase in Gastrin	Gastrin normally doubles with a test meal
Secretin Stimulation Test *Intravenous Infusion of secretin followed up by analysis of serum Gastrin levels	3000 pg/ml	0-180 pg/ml

**Physician Comments:**

The patient can find relief of gastric reflux symptoms with cimetidine, however it takes 3 times the normal dose and must be give 4 to 5 times a day to have an effect. The administration of a cholinergic antagonist enhances the effect of cimetidine so that the cimetidine dose can be lowered. A normal single daily dose of omeprazole is effective in relieving gastric reflux symptoms.

## Part III—Help the doctor explain the diagnosis and findings

(These questions are due to be submitted in two weeks. You do have two weeks to work on this lab with your groups)

---

### Questions:

**Be sure to explain your answers. Be specific and give good rationales for your answers.**

1. The doctor decided that Bella was suffering from a condition that is often inherited but then later manifests itself through what is known as Knudson's two-hit hypothesis. After looking over all the evidence of this case, what is the diagnosis. Explain why you chose your answer.
2. Identify all of Bella's blood lab values that are outside of normal (Table 1). Explain how the disease you diagnosed will clearly explain each blood lab value.
3. Explain a reason that Bella would have a fracture in her scaphoid bone?
4. Come up with a rationale to explain Bella's headaches and vision problems (remember that there are no pain receptors in the brain or spinal cord...so how will you explain where the pain is coming from. Drawing a picture can be very helpful to explain the vision problems).
5. Explain why the patient has elevated HCL secretion?
6. What would you expect the patients rate of pepsinogen secretion to be? Explain
7. Why does the patient have a duodenal ulcer? Why does the patient NOT have a gastric ulcer?

8. The patient is losing weight, has diarrhea and steatorrhea. These symptoms are all related to the same issue. What is causing these things?
9. Explain why the patient does NOT have an increase in serum gastrin after a test meal.
10. Explain why the patient has such a large increase in serum gastrin after intravenous infusion of secretin.
11. Why is cimetidine effective? Why are such large and frequent doses of cimetidine required? How might a cholinergic antagonist work to enhance the effectiveness of cimetidine.
12. How does omeprazole work to help the patient's symptoms? Why is it effective with a normal daily dose?