

Sample Written Exam – General Internal Medicine

Question 1

You are called by a relatively inexperienced physician practicing in a rural emergency department 3 hours from your centre. He has just admitted a 22-year-old woman with type 1 diabetes who has confirmed diabetic ketoacidosis.

On physical examination, she is oriented and in moderate distress. Vital signs are as follows: blood pressure 95/55 mm Hg, heart rate 110 bpm, respiratory rate 26/min, temperature 37.2°C; oxygen saturation is 99% on 2 L O₂/min via nasal prongs. The physical examination is otherwise non-contributory.

Initial laboratory investigations reveal the following results:

pH 7.1

pCO₂ 24 mm Hg

pO₂ 99 mm Hg (99%)

HCO₃ 8 mmol/L

Na 145 mmol/L

K 4.4 mmol/L

Cl 107 mmol/L

Urea 25 mmol/L

Creatinine 130 µmol/L

Glucose 30 mmol/L

- a. List **FOUR** general goals of initial treatment.

MODEL ANSWER (1 mark each, 4 marks total)

The optimal answer will include the following 4 elements:

- Correct volume deficit
- Stop ketogenesis using intravenous insulin
- Replace the potassium deficit
- Identify and treat the precipitant

- b. List **THREE** items of general information that you will provide to the physician about managing the patient as her glucose level normalizes.

MODEL ANSWER (1 mark each, 3 marks total)

The optimal answer will include the following 3 elements:

- Continue intravenous insulin until anion gap (AG) has normalized
- Add intravenous glucose to fluids
- Ensure an overlap with subcutaneous insulin before stopping intravenous insulin



Question 2

A 45-year-old man is referred to your outpatient clinic by his family physician for fatigue.

He reports a 2-year history of debilitating fatigue. He had a flu-like illness a couple of weeks before the onset of the fatigue, but was well prior to this. He has no significant past medical or past psychiatric history and takes no medications.

He sleeps 8-10 hours per night, but does not feel refreshed in the morning. He feels "completely exhausted", and lies down for an hour every afternoon, but does not fall asleep. The fatigue is much worse after exertion, so he has stopped going to the gym. He still works, but rarely has the energy to socialize with his friends. He admits that he often feels "down" because the fatigue is not getting better. His concentration is somewhat impaired, which he attributes to the fatigue. His weight has been stable, and review of systems is, including further questioning about depressive symptoms, negative.

He and his partner are farmers. He smokes 2 pipes a day and has 1 ounce of gin every night. A thorough physical examination is performed. He has a flat affect, but no other significant abnormal finding is detected.

His family physician has sent you the results of the following investigations, all performed within the last 3 months:

- CBC (including differential), electrolytes (including Ca, Mg, and PO₄), creatinine, urea, glucose, liver enzymes, CK, INR, TSH, cortisol (following ACTH stimulation), CRP and ESR: all normal.
- Serologies for HIV, Epstein-Barr virus (EBV) and Lyme disease were negative.
- Blood cultures incubated for 4 weeks have been negative on 2 separate occasions.
- Chest radiograph revealed no abnormality.

a. What further investigations, if any, would you suggest at this time? List no more than **TWO**.

MODEL ANSWER (2 marks total)

The optimal answer will include the following element:

- No further investigations (accept variants of "watchful waiting" or "longitudinal observation")

b. What **TWO** recommendations will you make regarding management?

MODEL ANSWER (1 mark each, 2 marks total)

The optimal answer will include the following 2 elements:

- Graded exercise program
- Cognitive behaviour therapy



Question 3

You are asked to see a 59-year-old otherwise healthy man in consultation for weakness and falls. He first noticed clumsiness and difficulty with performing tasks such as writing about 6 months ago, and the symptoms seem to be getting worse. He has had 3 falls, one of them resulting in a scalp laceration that required sutures.

He denies visual symptoms. His speech and swallowing are normal, and his bowel and bladder function are intact. He denies any pain in his muscles.

On physical examination, he has mild muscle atrophy in the quadriceps and biceps. He has increased tone. Reflexes are 3+ in the upper and lower extremities distally. Toes are up-going. Strength is 4 to 4+ throughout the upper and lower extremities.

Fasciculations are noted. Heel- and toe-walking are impaired.

After the patient completes the diagnostic tests, his wife contacts you to discuss the case. She is worried that her husband is not emotionally resilient and would not cope well with bad news. He is undergoing a lot of stress at work; his wife feels that any bad news would be devastating to him and may affect his ability to succeed. She asks to meet with you privately to review the results of the tests so that she can decide when and how to disclose the information to her husband.

- a. Based on the available information, what is the MOST LIKELY diagnosis?

MODEL ANSWER (1 mark total)

The optimal answer will include the following element:

- ALS (amyotrophic lateral sclerosis, motor neuron disease)

- b. List **TWO** elements that should be considered when addressing the wife's request.

MODEL ANSWER (1 mark each, 2 marks total)

The optimal answer will include any 2 of the following elements:

- Ask the patient if he wants to know the diagnosis or not (or if he would prefer that the information be delivered to his wife or other individual)
- Assess patient's capacity
- Inform the wife that you cannot share his medical information with others, or withhold information from him without his express consent.



Question 4

You are replacing a colleague on vacation and are seeing one of his patients in follow-up. A screening test for HIV has been performed as part of a pre-employment protocol. The enzyme-linked immunosorbent assay (ELISA) was positive. The results of a Western blot analysis (a confirmatory test) will be available in 1 month. The patient is sexually active in a monogamous relationship and has no other HIV risk factors. He is aware of his ELISA result and wants to know his risk of being infected with HIV.

The laboratory that performs the ELISA provides information about the test when used as a screening test in a population similar to that of your patient, with an overall HIV prevalence rate of 1:200. In this population, the sensitivity of the test is 99% and the specificity is 98%. A 2x2 table summarizing the performance characteristics of the test is provided below.

Performance characteristics of
HIV testing in a known population

| | | HIV Disease status | | |
|--------------------|---|--------------------|--------------|--------------|
| | | + | - | |
| ELISA test for HIV | + | 99 | 396 | 495 |
| | - | 1 | 19400 | 19401 |
| | | 100 | 19796 | 19896 |

A B
C D

What is the probability that this patient has HIV? You do NOT need to show your calculations.

MODEL ANSWER (1 mark total)

The optimal answer will include the following element:

The probability of this patient having HIV is the positive predictive value of the test. Any of the equivalent expressions listed below would be correct answers.

- A/(A+B)
- 99/(99+396)
- 99/495
- 1/5
- 0.2
- 20%

The patient's risk of having HIV could also be expressed as odds.
The odds of him having HIV are 1:4.



Question 5

A 58-year-old woman is referred to the general internal medicine clinic for refractory hypertension. The patient does not know what medications she is taking. A telephone call to her pharmacy reveals that her current medications are as follows:

- hydrochlorothiazide 25 mg PO daily
- amlodipine 10 mg PO daily
- metoprolol 75 mg PO twice daily
- ramipril 10 mg PO daily
- atorvastatin 20 mg PO daily

Her BP is 162/92 mm Hg, and HR is 84 bpm and regular. You suspect medication non-adherence.

- a. List **THREE** potential reasons for medication non-adherence that you should explore in your discussion with the patient.

MODEL ANSWER (1 mark each, 3 marks total)

The optimal answer will include any 3 of the following elements:

- Does not understand how to take the medications e.g., confused by dose, timing or instructions
- Does not understand the benefits of taking medications (e.g., better control of BP is associated with less risk of stroke and MI)
- Taking the medications is inconvenient (e.g., she forgets evening dose)
- Side effects
- Cost of medication
- Cultural beliefs
- Lack of patient-physician trust

- b. List **THREE** medical-related changes that may improve this patient's medication adherence.

MODEL ANSWER (1 mark each, 3 marks total)

The optimal answer will include any 3 of the following elements:

- Reassess need for number of medications
- Decrease pill burden by initiating once daily dosing: change metoprolol to once per day (SR) formulation or to once per day beta-blocker (e.g., change bisoprolol or atenolol)
- Decrease pill burden through combination pills (e.g., combined ACE inhibitor and diuretic; combined calcium channel blockers and HMG co-A reductase inhibitor
- (e.g., amlodipine and atorvastatin to amlodipine/atorvastatin [Caduet®] 10/20)
- Prescribe less expensive medications within a class
- Prescribe medications covered by her drug insurance program
- Prescribe medications that exist as generics
- Dose / Dispill
- Supervision of medication administration