

A Tragic Finding: Metabolism in an Alcoholic Patient

by

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Part I – Hypoglycemia

A 50-year old Asian woman was found breathing but unresponsive in her home. According to family members who called emergency services, she had been drinking alcohol continuously for two days. The patient had a history of chronic alcoholism and hepatitis-C. A fingerstick glucose test done by the paramedic returned a value of < 20 mg/dL, indicating severe hypoglycemia.



As a team, come up with hypotheses about what caused the hypoglycemia. Be prepared to share your team's hypotheses with the class, along with your rationale for your hypotheses.

The questions below are designed to guide you in developing your hypotheses. You may need to seek additional resources to explore the questions below. Some reliable online resources for medical tests and conditions include WebMD.com, CDC.gov, and MayoClinic.org.

Questions

1. What is the normal range for blood serum glucose?
2. What symptoms might you expect to see at levels above, and below, the normal values for blood serum glucose? (It may be useful to consider consequences of acute changes in glucose levels for the patient, and also the long-term effects of chronically high or low glucose.)
3. What metabolic mechanisms are normally at work to keep blood glucose levels within the normal range?
4. What are the symptoms and consequences of the patient's chronic conditions of hepatitis C and alcoholism?
5. What conditions in the patient may have altered her normal glucose metabolism?

Part II – What to Test?

The patient was taken to the hospital via ambulance. On the way she was given a treatment consisting of a bolus injection (an injection given rapidly, all at once) of 50 mL 50% dextrose (D-glucose). At the hospital, the doctor examined the patient and found her to exhibit rapid, labored breathing while remaining unresponsive. Pulse oximetry showed blood oxygen saturation at 93%. The medical team obtained another fingerstick glucose, which now registered 37 mg/dL. An interview with family members revealed that the patient had been vomiting, and that they could not recall her eating during this binge-drinking episode. The doctor ordered further tests.



In your team, use this new information to refine your hypotheses and consider what further information you need to determine what is happening with the patient’s metabolic processes. Be prepared to ask for test results, and give a rationale for ordering each test. As a class, you will come up with a complete list of tests that you would like to see. Answer the following questions to guide your thoughts.

Questions

1. Were your hypotheses consistent with all the information you now have about the patient?

2. What medical tests would you like to see, and how will you use the results to confirm or rule out your suspicions about the patient’s condition?

Part III – Results

Once the test results were returned, the doctor reviewed them and determined the next steps for the patient.



In your team, use the test results (provided by your instructor) to determine the metabolic state of the patient, and what might be the next treatment steps. Your team should be prepared to participate in a class discussion about the patient. This will include discussing the significance of test results, working as a class to come up with an overall picture of the patient's metabolism that fits the medical facts of the case, and predicting possible outcomes for this patient.

Questions

1. Utilize the test results to come up with a complete metabolic scenario consistent with the patient examination and test results. Which metabolic pathways may be involved? What dysfunction of these metabolic pathways have likely contributed to the patient's condition?

2. Are there any further tests you would like to see?

3. Make a list of medical treatment suggestions that may be helpful for this patient, along with a rationale for each treatment that your team suggests.