

Case Study 1: Patient N.B.

Diabetic Ketoacidosis

Patient Profile

N.B., a 34-year-old Native American man, was admitted to the emergency department after he was found unconscious by his wife in their home.

Subjective Data (Provided by Wife)

- Was diagnosed with type 1 diabetes mellitus 12 mo. ago
- Was taking 50 U/day of insulin: 5 U of lispro insulin with breakfast, 5 U with lunch, and 10 U with dinner Plus 30 U of glargine insulin at bedtime
- States a history of gastroenteritis for 1 wk with vomiting and anorexia
- Stopped taking insulin 2 days ago when he was unable to eat

Objective Data

Physical Examination

- Breathing deep and rapid
- Fruity acetone smell on breath
- Skin flushed and dry

Diagnostic Studies

- Blood glucose level 730 mg/dL (40.5 mmol/L)
- Blood pH 7.26

Discussion Questions

1. Briefly explain the pathophysiology of the development of diabetic ketoacidosis (DKA) in this patient.

DKA happens when glucose levels are elevated and there is no insulin production from the beta cells of the pancreas to latch onto the glucose and carry it into the cell for fuel. When glucose levels continue to rise with no insulin present the body attempts to compensate by breaking down and burning ketones for energy.

2. What clinical manifestations of DKA does this patient exhibit?

The clinical manifestations presented by the patient: fruity breath, which is due to the body burning ketones, Kussmaul breathing as the body's way of attempting to blow off excess carbon dioxide, pH being 7.26 which shows the patient is acidotic and a BG reading of 730 mg/dL. Patient also exhibits signs of hyperglycemia such as flushed, dry skin.

3. What factors precipitated this patient's DKA?

The patient is a newly T1DM who stopped his insulin 2 days ago due to gastroenteritis. On top of the body not receiving insulin to help lower blood glucose levels it has also been under stress due to this illness causing counterregulatory hormones to signal the body to raise blood glucose levels even further.

4. Priority Decision: What is the priority nursing intervention for N.B.?

The priority intervention for this patient would be to rehydrate him with IV fluids. Once patient has received IV placement and fluid is connected his blood sugar should be addressed by administering insulin per the physician's orders.

5. What distinguishes this case history from one of hyperosmolar hyperglycemic syndrome (HHS) or Hypoglycemia?

The distinguishing factor from HHS would be that this patient is T1DM, though T2DM can experience DKA it is mainly seen in T1DM. The blood glucose reading is also another distinguishing factor as the blood glucose

reading in a patient suffering from HHS may be higher than 730 mg/dL. This case is different from a patient experiencing hypoglycemia mainly due to blood glucose reading which was high instead of low meaning there is too much sugar in the body as opposed to not enough. Patient did not show any signs for hypoglycemia such as sweating, confusion clammy cold skin, irritability.

6. Priority Decision: What is the priority teaching that should be done with this patient and his family?

A priority teaching should be the sick day rules. As the patient has a history of gastroenteritis there is a high chance patient may experience episodes of vomiting and anorexia or may not feel up to eating. Informing his family if that should happen to continue his insulin regime as normal and increase fluid consumption with high carbohydrate drinks that have some calories in them such as broth or juices. Also teaching them to help patient check his blood sugars every 4 hours to monitor for hyperglycemia and to check ketones in urine as well. Should it become increasingly difficult to keep fluids down or if patient detects ketones in his urine, he should contact his primary care provider's office immediately for further recommendations.

7. What role should N.B.'s wife have in the management of his diabetes?

N.B.'s wife should have a role in patient's diabetic management as far as supporting patient with the proper diet and exercise. Patient having support in the household especially with diet changes may help the patient make the necessary steps to prevent any complications secondary to his T1DM diagnosis.

8. Priority Decision: Based on the assessment data presented, what are the priority nursing diagnoses? Are there any collaborative problems?

Based on the assessment data a priority nursing diagnosis could be need for health teaching due to patient being unfamiliar with the cause, prevention, and treatment of DKA. This problem could be collaborated with another nursing diagnosis of potential for erratic BG levels due to inadequate blood glucose monitoring, periodic illness/other stressors, and ineffective medications management.

9. Evidence-Based Practice: N.B.'s wife asks you if she should have given her husband insulin when he got sick? How would you respond?

I would first reassure N.B.'s wife that they did the best thing at the time which was to bring patient to the emergency room as insulin administration at home when patient is to this point would likely not have changed his condition too much and would not be the safest option as patient would need to be closely monitored while bringing his BG levels back down. I would then educate her on the importance of keeping insulin administration as consistent as possible even during periods of illness as the patient will attempt to compensate for this stressor and patient's blood sugar will elevate as a result. I feel discussing the key points of the sick day rules and giving examples of good fluid replacement options would be the most beneficial.