

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. Diabetic ketoacidosis (DKA) can develop quickly or over several days or weeks. It is caused by a profound deficiency of insulin and is characterized by hyperglycemia, ketosis, acidosis, and dehydration. For N.B., DKA developed because of too little insulin accompanied by increased physical stress (the gastroenteritis), which increases the demand of the body for insulin
2. What clinical manifestations of DKA does this patient exhibit? N.B. presents with deep, rapid breathing; acetone smell on breath; and skin flushed and dry. These are all clinical manifestations of DKA.
3. What factors precipitated this patient's DKA? N.B. was experiencing gastroenteritis. The vomiting and anorexia resulted in decreased caloric intake. At the same time he stopped taking his insulin. When the insulin supply is insufficient, glucose cannot be properly used for cellular energy. In response to cellular starvation, N.B.'s body released and broke down stored fats and protein to provide the needed energy. Excess ketones altered the pH balance, and acidosis developed. More water was lost as ketones were excreted (ketonuria) in an attempt to balance the

pH. The result is an increase in blood glucose and nitrogen. Dehydration and loss of electrolytes, particularly potassium, ensued. His skin became dry and loose, and his eyeballs became soft and sunken. Hypotension with a weak, rapid pulse could develop.

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

Maintenance of a patent airway and oxygen administration should be the first nursing interventions. Because fluid imbalance is potentially life threatening, the initial goal of therapy is to establish IV access and begin fluid and electrolyte replacement.

5. What distinguishes this case history from one of hyperosmolar hyperglycemic syndrome (HHS) or Hypoglycemia? Maintenance of a patent airway and oxygen administration should be the first nursing interventions. Because fluid imbalance is potentially life threatening, the initial goal of therapy is to establish IV access and begin fluid and electrolyte replacement.

6. Priority Decision: What is the priority teaching that should be done with this patient and his family? N.B. and his family need to be taught that when N.B. has a minor illness, such as a cold or gastroenteritis, he should continue drug therapy and food intake. Substitution with a carbohydrate liquid such as regular soft drinks, gelatin dessert, or beverages such as Gatorade may be necessary. The patient should understand that food intake is important during this time because the body requires extra energy to deal with the stress of the illness.

7. What role should N.B.'s wife have in the management of his diabetes? When N.B. became ill, his wife may have needed to play a more direct role in his care, including the monitoring of blood glucose levels and encouraging fluids and food intake.

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

Nursing diagnoses: deficient fluid volume, ineffective self-health management, risk for injury, deficient knowledge, imbalanced nutrition: less than body requirements

Collaborative problems: hyperglycemia, coma, electrolyte disturbances

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? Teach the caregivers of patients with type 1 diabetes the importance of helping to monitor the glucose levels of the patient and give insulin. Caregivers need to know that when their loved one becomes sick, they need to assume primary responsibility for their care, including monitoring blood glucose and administering insulin