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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 mmo1/L)
- Blood pH 7.26

Discussion Questions
1. Briefly explain the pathophysiology of the development of diabetic ketoacidosis (DKA) in this patient.
   The DKA was brought on by a triad of factors: hyperglycemia, acidemia and ketonemia. For one, the patient had been experiencing gastroenteritis. A diabetic patient that becomes ill will experience an increase in blood glucose levels due to the increase in counter regulatory hormones such as cortisol. This patient has also not taken his insulin for the past two days, which accounts for the decrease in insulin. The increase in counter regulatory hormones and decrease in insulin lead to the increase of his blood glucose level to 730 mg/dl. Because of the lack of glucose in the cells, they begin to burn fat for energy, producing ketones that excrete into the urine and blood leading to metabolic acidosis. The high concentration of glucose in the blood causes the dehydration that accompanies DKA, which was more than likely exacerbated by the vomiting the patient was experiencing.

2. What clinical manifestations of DKA does this patient exhibit? .
   The patient presented with Kussmaul respirations, anorexia, N/V, and sweet fruity breath, not conscious

3. What factors precipitated this patient's DKA?
   The patient's gastroenteritis, lack of eating, and stopping of his insulin for 2 days

4. Priority Decision: What is the priority nursing intervention for N.B.?
   Number one priority is to get the patient on NS IV for rehydration.

5. What distinguishes this case history from one of hyperosmolar hyperglycemic syndrome (HHS) or Hypoglycemia?
   DKA is most often seen in T1D persons with a rapid onset, and HHS is more prevalent in T2D with a slower onset. DKA patients will present as acidotic with a pH<7.3, while HHS is not with a pH >7.3. DKA will have HOC3 levels of <15-16, HHS are >30, and DKA present with ketones in their urine while HHS will not. Even though HHS patients will usually present with a higher blood glucose level of >600, and DKA with >250, and this patient was at 730, all the other factors point to DKA. Also, DKA patients will have elevated blood

glucose levels, be hot and dry whereas hypoglycemia has very low blood glucose levels, <70, and cold and clammy.

6. Priority Decision: What is the priority teaching that should be done with this patient and his family?
Number one thing to teach would be to ALWAYS take your insulin medications even when you are sick to prevent DKA and other issues associated with lack of insulin.

7. What role should N.B.'s wife have in the management of his diabetes?
His wife should provide emotional and other support. She should encourage him to see his doctor regularly, to take his blood sugars and insulin as prescribed, and to help him with assessing his well being, like making sure he checks his feet and skin integrity, that he eats a proper diet and encouraging him to exercise and perhaps participate with him on these things.

8. Priority Decision: Based on the assessment data presented, what are the priority nursing diagnoses? Are there any collaborative problems?
dehydration, possible hypokalemia, elevated blood sugars, poor diabetes management
The dehydration and elevated blood sugars are collaborative problems that require a provider order to carry out are the dehydration/hyperkalemia-need NS/potassium fluid order and transfer to ICU for continuous monitoring of K levels, elevated blood sugars-need insulin medication provider order. The nurse can provide teaching on the importance of insulin adherence and help with educational resources for the patient and family

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?
Yes, a diabetic still should take their insulin when sick because illness will cause an increase blood sugar levels. If he cannot eat normally, supplement carbohydrate containing fluids for insulin admin. If his blood sugars are low hydrate with carby fluids. If blood sugars are high give water and carb free fluids and check urine ketones every 4 hours. If ketones are present, take rapid acting insulin. Hydration is very important!