

Case Study Responses

Expert Opinion provided by Derek LeRoith, MD, PhD

Chief of the Division of Endocrinology and Diabetes
Mount Sinai School of Medicine, New York, New York

Note: Readers are encouraged to visit www.InsulinJournal.com to review the details of a Case Study published in the October 2007 issue of *Insulin*.

This was the case of a 16-year-old obese (body mass index, 32 kg/m²) black male who presented to the emergency department in “acute distress.” Two weeks before admission, the patient had noted polyuria, nocturia, weight loss (despite being constantly hungry), and little energy. Two days before admission, he developed headaches, generalized abdominal pain, nausea, and vomiting. Although the patient was in acute distress, he was able to respond appropriately to questioning.

Question 1. What is the most appropriate clinical diagnosis based on the available data at admission?

Answer: b. Diabetes mellitus (DM) with diabetic ketoacidosis (DKA).

Based on the history and the presence of hyperglycemia, the patient certainly has DM. Because of the patient’s acidosis and ketonuria, the diagnosis of DKA is appropriate. The lactate is normal at this time, ruling out concurrent lactic acidosis. Coma is not present.

Question 2. At this point, which of the following conditions is NOT a major medical concern in this patient?

Answer: d. Hyperglycemic nonketotic coma.

Oliguria with a rising serum creatinine are consistent with acute tubular necrosis. The patient’s hypotension and severe acidosis are consistent with impending cardiovascular collapse. His deteriorating mental status and aggressive fluid resuscitation suggest possible cerebral edema. Because the patient is in DKA, by definition, hyperglycemic nonketotic coma is not a concern.

Question 3. Based on the above information and case history, what type of diabetes does this patient have?

Answer: d. Atypical diabetes of African Americans.

Type 1 DM is unlikely based on the absence of islet autoantibodies and high-risk human leukocyte antigen (HLA) type, HLA-DQB1 alleles (note: HLA-DQB1*0602 is protective of type 1 DM). Obesity is consistent with type 2 DM, and adolescents with type 2 DM can present with DKA. However, the family history of early-onset diabetes in the mother (eg, an autosomal dominant pattern) and DKA in the patient most strongly suggest atypical diabetes of African Americans.¹ Patients with maturity-onset diabetes of the young (MODY-1), hepatocyte nuclear factor (HNF)-4 alpha mutations, or MODY type 3 (MODY-3), HNF-1 alpha mutations, do not develop DKA.

Question 4: What factors predispose to bacterial and/or fungal infection in people with DM? What type of infection is associated with prolonged acidosis in people with DM? Anatomically, where is this infection identified most commonly?

Several factors predispose to infection in the setting of DM. Hyperglycemia interferes with phagocyte function; therefore, hyperglycemia induces a defect in innate (natural) immunity. Hyperglycemia also creates an environment in the tissues and urine that better allows for the growth of bacteria. Ischemia is another important factor that predisposes to infection because of poor wound healing, hypoxia, and deficient delivery of blood to infected tissues.

Mucormycosis is the classic pathogen associated with prolonged acidosis. Usually mucor infects the nasal passages in a necrotizing process. However, in the patient presented, mucor caused a pulmonary infection.

REFERENCE

1. Winter WE, Maclaren NK, Riley WJ, et al. Maturity-onset diabetes of youth in black Americans. *N Engl J Med.* 1987;316:285–291.

Readers are invited to consider a new Case Study (see page 48) and submit responses to www.InsulinJournal.com before the deadline.