

Pagana: Mosby's Manual of Diagnostic and Laboratory Tests, 6th Edition

Adolescent With Diabetes Mellitus (DM)

Case Studies

The patient, a 16-year-old high-school football player, was brought to the emergency room in a coma. His mother said that during the past month he had lost 12 pounds and experienced excessive thirst associated with voluminous urination that often required voiding several times during the night. There was a strong family history of diabetes mellitus (DM). The results of physical examination were essentially negative except for sinus tachycardia and Kussmaul respirations.

Studies	Results
Serum glucose test (on admission), p. 227	1100 mg/dL (normal: 60–120 mg/dL)
Arterial blood gases (ABGs) test (on admission), p. 98	
pH	7.23 (normal: 7.35–7.45)
PCO ₂	30 mm Hg (normal: 35–45 mm Hg)
HCO ₂	12 mEq/L (normal: 22–26 mEq/L)
Serum osmolality test, p. 339	440 mOsm/kg (normal: 275–300 mOsm/kg)
Serum glucose test, p. 227	250 mg/dL (normal: 70–115 mg/dL)
2-hour postprandial glucose test (2-hour PPG), p. 230	500 mg/dL (normal: <140 mg/dL)
Glucose tolerance test (GTT), p. 234	
Fasting blood glucose	150 mg/dL (normal: 70–115 mg/dL)
30 minutes	300 mg/dL (normal: <200 mg/dL)
1 hour	325 mg/dL (normal: <200 mg/dL)
2 hours	390 mg/dL (normal: <140 mg/dL)
3 hours	300 mg/dL (normal: 70–115 mg/dL)
4 hours	260 mg/dL (normal: 70–115 mg/dL)
Glycosylated hemoglobin, p. 238	9% (normal: <7%)
Diabetes mellitus autoantibody panel, p. 186	
insulin autoantibody	Positive titer >1/80
islet cell antibody	Positive titer >1/120
glutamic acid decarboxylase antibody	Positive titer >1/60
Microalbumin, p. 872	<20 mg/L

Diagnostic Analysis

The patient's symptoms and diagnostic studies were classic for hyperglycemic ketoacidosis associated with DM. The glycosylated hemoglobin showed that he had been hyperglycemic over the last several months. The results of his arterial blood gases (ABGs) test on admission indicated metabolic acidosis with some respiratory compensation. He was treated in the

emergency room with IV regular insulin and IV fluids; however, before he received any insulin levels, insulin antibodies were obtained and were positive, indicating a degree of insulin resistance. His microalbumin was normal, indicating no evidence of diabetic renal disease, often a late complication of diabetes.

During the first 72 hours of hospitalization, the patient was monitored with frequent serum glucose determinations. Insulin was administered according to the results of these studies. His condition was eventually stabilized on 40 units of Humulin N insulin daily. He was converted to an insulin pump and did very well with that. Comprehensive patient instruction regarding self-blood glucose monitoring, insulin administration, diet, exercise, foot care, and recognition of the signs and symptoms of hyperglycemia and hypoglycemia was given.

Critical Thinking Questions

1. Why was this patient in metabolic acidosis?
2. Do you think the patient will eventually be switched to an oral hypoglycemic agent?
3. How would you anticipate this life changing diagnosis is going to affect your patient according to his age and sex?
4. The parents of your patient seem to be confused and not knowing what to do with this diagnoses. What would you recommend to them?