

A 11-year-old man was brought to the hospital emergency room in a comatose state. His family stated that the patient had been nauseated earlier in the day. Upon physical examination, it was noted that the patient was breathing deeply and rapidly, his breath had a fruity odor, and his skin and mucous membranes were dry. The family was contacted and the mother stated that the woman had been diagnosed with Type II diabetes mellitus and the patient's older brother had Type I.

Laboratory Results

Na ⁺	125 mmol/L
K ⁺	6,3 mmol/L
Cl ⁻	93 mmol/L
HCO ₃ ⁻	9 mmol/L
BUN	45 mg/dL
Serum Osmolality	302 mOsm/kg
pH	7,20
pCO ₂	27 mm Hg
Serum glucose	600 mg/dL
Urine glucose	4+
Serum ketone	3+
Hematocrit	52%
Hemoglobin	16,8 g/dL
WBC	11.500/mm ³
RBC	6,3 million/mm ³

- Identify all abnormal laboratory values.
- On the basis of the patient's history, clinical findings, and laboratory data, the type of glucose intolerance would be classified as:
 - Type I Diabetes Mellitus
 - Type II Diabetes Mellitus
 - Impaired glucose tolerance
 - Gestational diabetes mellitus
- Which of the laboratory findings is most valuable in establishing the diagnosis as diabetic ketoacidosis?
- Why are the ketone bodies increased in diabetes mellitus?
- Would the insulin level be normal, increased or decreased in this patient? Explain this effect on the serum glucose level.
- What laboratory findings indicate a loss of body water, and why does this occur?
- Explain the patient's decreased HCO₃⁻ and pCO₂.
- Since the loss of body water can result in a hypokalemia, does the increased serum potassium indicate a lab error? Explain
- A slight increase in BUN can occur because of hemoconcentration. Describe another process that could account for an elevated BUN in diabetes mellitus.
- The patient is prescribed a daily regimen of insulin. Which of the following laboratory procedures would be of most value in determining the degree of glucose control over a 2-month period?
 - Fasting blood glucose
 - Albumin
 - OGTT
 - Glycated hemoglobin