Ketosis Causing Spurious Elevation of SGOT Values

Paul L. Wolf, Claire Langston, Abraham I. Potosky, and Dorothy J. Williams

In two patients, spurious enhancements of SGOT on SMA 12/60 determination caused erroneous diagnoses of liver disease, which could have led to potentially hazardous diagnostic measures. Such errors can be avoided by an ultraviolet spectroscopic check of suspect SGOT values.

Additional Keyphrases ultraviolet spectroscopy of SGOT • SMA 12/60 • AutoAnalyzer

This communication concerns two patients in whom spuriously enhanced sgot (serum glutamic-oxaloacetic transaminase; L-aspartate:2-oxoglutarate amino-transferase, EC 2.6.1.1), as determined by the SMA 12/60 AutoAnalyzer (Technicon Corp., Tarrytown, N.Y. 10591), led to erroneous diagnoses of liver disease. This error can be avoided by checking suspect supranormal SMA 12/60 values by ultraviolet spectroscopy (I).

Case Reports

Case 1

A 19-year-old man was admitted to the Stanford Hospital for treatment of diabetic ketoacidosis. Three years before this admission (during treatment of ketoacidosis), abnormal results of liver-function tests prompted a liver biopsy, the results of which were consistent with a diagnosis of viral hepatitis. Results of further liver-function tests slowly returned to the normally expected values, but on subsequent admissions for ketoacidosis, sgot activity, as determined by SMA 12/60, was consistently greater than normal. Chronic hepatitis was tentatively diagnosed on this basis, although the results of other liver-function tests were within clinical limits.

On the present admission, no abnormalities were seen on physical examination. Laboratory studies showed: blood glucose, 770 mg/100 ml; serum Na+, 136 mmol/liter; K+, 5.2 mmol/liter; Cl−, 95 mmol/liter; HCO3−, 3.5 mmol/liter; and serum acetone positive at 1:8 dilution. An SMA 12/60 screen ing battery showed an sgot of 180 U. LDH and alkaline phosphatase activities, and the concentration of total bilirubin in serum were within normal limits. SGOT, measured on the same serum sample by ultraviolet spectroscopy, gave a value of 45 U.

Case 2

A 58-year-old man was admitted for explanation and treatment of chronic gastrointestinal bleeding. Results of preoperative laboratory studies, including tests on an SMA 12/60, were within normal limits, except for findings consistent with iron-deficiency anemia. On laparotomy, 38 cm of diseased ileum was resected for bleeding telangiectasia. He developed ketosis and was maintained on intravenous fluids postoperatively. His serum was examined with the SMA 12/60 four days after operation, and showed its soor activity to be 100 U. The same sample, analyzed by ultraviolet spectroscopy, showed a value of 8 U. When the patient was again fed orally, the soor value by SMA 12/60 returned to normal.

Discussion

Both of these patients, who were ketotic because of uncontrolled diabetes mellitus or starvation, had spuriously increased soor values as measured by the SMA 12/60, but normal values as measured by (the more specific) ultraviolet spectroscopy. Colorimetric determination of soor with the SMA 12/60 is based on the coupling reaction of a diazonium salt of N-butyl-4-methoxyacetanilide with oxaloacetic acid produced when gort acts on α-ketoglutarate. Other ketone bodies, such as acetoacetic acid, will also couple with the dye, leading to enhanced soor values proportional to the concentration of the acetooxalic (2–4). Spuriously high SGOT values may thus be obtained by this method for cases of diabetic ketoacidosis, starvation, and glycogen storage disease of the liver, plus any other condition in which large amounts of ketone bodies are present in the serum (6). By contrast, the ultraviolet spectroscopic method of determination of soor activity is unaffected by ketone bodies; it measures the rate of decrease of NADH in the SGOT rate-dependent coupled reactions (7).

References


From the Stanford University Medical Center, Stanford, Calif. 94305. Received Oct. 31, 1970; accepted Jan. 22, 1971.