Seralyzer ARIS and Abbott TDX Theophylline II Assay Systems Compared

To the Editor:

For several years "TDA" reagent kits for estimating theophylline in serum have been supplied by the Ames Company. More recently, a new theophylline test has been developed, rabbit antiserum being replaced with monoclonal antibody to improve assay performance caused by lot-to-lot variation in antibody properties and also to overcome interferences in uremic sera caused by 1,3-dimethyluric acid (1,3-MU) (1-3). This new reagent kit is marketed as the Seralyzer Apoenzyme Reactivation Immunoassay System (ARIS) theophylline reagent strips.

In our laboratory we use Abbott Laboratories "theophylline II" system in the routine analysis for theophylline. We recently decided to evaluate the performance of the ARIS system by comparing results with those by the Abbott TDX theophylline II assay. Using Abbott TDX controls with stated theophylline values of 38.9, 66.6, and 144 μmol/L we evaluated within-run, between-run, and between-lot variation. All CVs were ≤5.0%. Correlation of the two methods by linear regression analysis of data on 94 patients being treated with theophylline gave the following equation: \( y = 1.05x + 2.79 \), with \( r = 0.99 \). However, we noted a large discrepancy between values obtained by the two methods for one of the patients: 115 μmol/L by TDX, 245 μmol/L by Seralyzer (this patient’s result was omitted from the regression analysis). Subsequently, this patient was found to be uremic, with urea and creatinine concentrations of 55 mmol/L and 607 μmol/L, respectively. Gas chromatography (2-m glass OV-17 column, run isothermally at 270 °C) revealed the presence of the theophylline metabolite 1,3-MU. Compounds investigated for cross reactivity were: 8-chlorotheophylline, dihydrotheophylline, 1,3-DMU, theobromine, caffeine, and uric acid. Our results compared well with those given in the technical-data manuals supplied by the two manufacturers. In an earlier product insert, 1,3-DMU was omitted from the list of compounds stated as not causing interference at "expected serum levels." However, in the latest revision of the Ames product insert, it is stated that "expected" concentrations of 1,3-DMU show no interference but that "high" concentrations of this metabolite in the serum of uremic patients would falsely increase Seralyzer theophylline results and therefore the ARIS assay should not be used to measure theophylline in uremic patients. We are pleased to note that the manufacturer has clarified the position in respect of 1,3-DMU on their product insert.

We conclude that results by the two methods correlate well, but the TDX theophylline II assay is less prone to interferences by cross reactivity.

Ronald B. Volcich
Gary M. Schier
Ignatius E. T. Gan
Inllowa Area Biochem. Service
Wollongong Hospital
Wollongong NSW 2500
Australia

Should Plasma High-Density Lipoprotein Phospholipids Be Evaluated?

To the Editor:

The correlation, if any, between the concentration of cholesterol (Chol) and phospholipids (Phos) in high-density lipoproteins (HDL) is still controversial. Rubiés-Prat et al. (1) reported that values for HDL Phos were normal or slightly above normal in serum of patients with liver cirrhosis and cholestasis, while HDL Chol concentrations were sharply decreased. More recently, Akaike et al. (2) saw no evident disassociation between HDL Chol and HDL Phos concentrations in patients with liver cirrhosis. Similar results were found by others (3). In order better to recognize the correlation of two analytes in HDL, we studied the relative concentrations in randomized samples from 420 outpatient subjects (4). The linear regression analysis of our data (HDL Chol vs HDL Phos) gave the equation \( y = 1.48x \pm 46.5 \text{ mg/dL}, r = 0.872 \). Afterwards we extended our study to 412 hospitalized subjects with liver cirrhosis (n = 70), at different stages of chronic renal failure (n = 58), diabetic (n = 57), with coronary artery disease (n = 92) angiographically ascertained, and with other (unclassified) diseases (n = 105). HDL were separated from Apo B-containing lipoproteins by mixing 0.1 mL of fresh serum with 1.0 mL of unbuffered polyethylene glycol 6000 to give a final concentration of 90 g per liter. After the mixture had stood for 15 min at room temperature, HDL were separated by centrifugation (1500 × g, 15 min, room temperature).

The results we obtained by this rapid procedure correlated very well with those by ultracentrifugation (5). HDL Chol and HDL Phos (as phospholipids containing choline) were measured by two commercial enzymatic-colorimetric kits in a "Cobas Bio" (Roche) centrifugal analyzer. The within-assay precision (CV, %) was 2.4 for HDL Chol, 3.1 for HDL Phos. We found that the HDL Chol and HDL Phos concentrations were strictly correlated in all groups of classified diseases with decreased values of the analytes, and likewise that they agreed well for the samples with increased HDL. For the patients with coronary artery disease, average values of HDL Chol alone were not a reliable index to severity (6).

A similar result was obtained for HDL Phos values (unpublished data) and, contrary to the results previously reported by Naito (7), we saw no evident correlation between the HDL Phos/total Chol ratio and severity of coronary artery disease. The equation for the overall correlation between the concentrations of HDL Chol (x) and HDL Phos (y) was \( 1.22x \pm 44.2 \text{ mg/dL}, r = 0.912 \). In agreement with Akaike et al. (2), we believe that assay of HDL Phos does not give more clinically useful information than measuring HDL Chol.

References