be well prepared for these relatively infrequent cases of ethylene glycol poisoning. We believe that glycolic acid measurements can be useful as a supplement, but not as a substitute, to serum ethylene glycol determination, although in most cases the latter will be sufficient. Furthermore, serum ethylene glycol determined enzymatically should be confirmed by another method such as gas chromatography–mass spectrometry (6). However, in the acute setting of managing the intoxicated patient, the use of serum ethylene glycol (determined enzymatically on an automated analyzer) and osmolar gaps coupled with arterial blood gases measurements will provide the greatest diagnostic yield at lowest cost. This approach is of particular utility in many medical centers that do not have access to a sophisticated reference toxicology laboratory. Thus, a recent survey of 95 teaching hospitals has shown that ethylene glycol determination was performed in only 25% of the polled hospitals (with a median turnaround time of 1.5 h), whereas if the test was sent out, the turnaround time was 42 h (9).

References

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The Nonlinearity Seen for LDL-Cholesterol with Lyophilized Material Is a Matrix Effect

To the Editor:
Recently, Genzyme Corporation (Cambridge, MA) developed and patented a direct method for LDL-cholesterol (LDL-C) determination. The method uses an antibody to separate LDL from VLDL and HDL. Because the method is analogous to that for HDL-cholesterol (HDL-C) in that it requires a separation step and that matrix effects have been documented to interfere with the assessment for linearity for that analyte, we investigated the effect matrix has on the evaluation of linearity for the direct measurement of LDL-C (1).

We determined LDL-C on the Cobas FARA (Roche Diagnostic Systems), using cholesterol reagents: cholesterol esterase and oxidase (Boehringer Mannheim Diagnostics) and an LDL-C kit (Sigma Diagnostics). We tested linearity, using the following materials: CAP Linearity Survey material, and the lyophilized materials, CAP Linearity Survey material, and the LDL and HDL controls all had statistically significant nonlinear coefficients (P <0.02) and were nonlinear. The routine serum and concentrated, postpictoriant pools did not have statistically significant beta coefficients and therefore were linear. The nonlinearity of the HDL-C and LDL-C controls and the CAP samples was sigmoid in shape, whereas the serum, concentrated serum, and LDL-C control material precipitated before dilution, all appeared linear (Fig. 1).
Previous studies showed that methods for the determination of HDL-C were nonlinear with CAP linearity survey material as well as with the quality-control materials supplied with each method (1). These HDL methods were linear, however, when fresh sera was used for the linearity studies, indicating that the observed nonlinearity was a result of the material matrix and not the method itself. In this study, we observed similar results for LDL-C, as determined with Sigma reagents. The Sigma Diagnostics method for the direct determination of LDL-C is linear for serum samples. The reportable range can be extended by concentrating a serum pool. Lyophilized, processed materials, as seen with controls or CAP survey materials, are nonlinear with this method, but the nonlinearity is a matrix effect of the material. The nonlinearity of the matrix effect occurs at the separation step.

One of the common factors for processed materials is that many of these materials are lyophilized. Many studies have shown that lyophilized materials exert a matrix effect on the determination of cholesterol (3–6). These studies suggest that the act of lyophilization alters the native state of lipoproteins. The nonlinearity seen with the processed materials for the HDL and LDL methods strongly suggests that the observed matrix effects are dependent on the concentrations of the analyte as well as the other lipoproteins. We encourage those who use the LDL-C method to establish their reportable range with fresh serum pools. One may concentrate the sera, as performed in this study, to further extend the reportable range.

References