Lidocaine Is Stable In Serum and Blood

To the Editor:

Lidocaine is a frequently administered anti-arrhythmic drug, particularly useful in emergency situations because of its rapid onset of action (1). Therapeutic drug monitoring of lidocaine is recommended because of its potent central nervous system toxicity. Moreover, lidocaine has been implicated in numerous accidental and homicidal deaths (2). Thus its chemical stability in patients' specimens and in quality-control specimens needs to be known. Two metabolites of lidocaine, monoethylglycinexylidide and glycine-lidide, are unstable in plasma and urine (3), but no work has been published on the stability of lidocaine itself. Therefore, we have assessed the stability of lidocaine in serum and blood.

Sera from patients being treated with lidocaine were pooled and stored at −20 °C until used. Cadaver blood containing lidocaine was also collected and pooled. After an initial quantification by gas chromatography (4), the serum and blood were each divided into two portions. One was stored at 25 °C, the other at 4 °C. At various time intervals, aliquots of fluid stored at each temperature were removed and re-assayed. After 70 days, at least 80% of the lidocaine was detected in serum at either temperature. Furthermore, no changes in blood lidocaine concentration were detected over a similar time period at either temperature. Any changes in lidocaine concentration were within the out-of-run CV of the method.

We conclude that lidocaine is quite stable in serum and blood over a two- to three-month period.

References

Evaluation of the Brom cresol Purple Method for Albumin as Used with the aca

To the Editor:

Brom cresol green (BCG) dye-binding methods are widely used to quantify serum albumin, even though numerous reports indicate that BCG lacks specificity (1, 2). Brom cresol green reacts within seconds with albumin, but within minutes it also reacts with acute-phase reactants; gamma-globulins do not interfere (3). Results of BCG methods in which this phenomenon is taken into account (4) correlate better with those by immunochemical and electrophoresis methods. At higher temperatures the slower reaction makes the assay even less specific for albumin (1), and this has caused additional problems for its use in the Du Pont aca discrete analyzer, which operates at 37 °C with a reaction time of 261.5 s.

In an attempt to eliminate this problem, Du Pont recently adapted the brom cresol purple (BCP) dye-binding method for albumin to the aca. This method, first described by Louderback et al. (5), reportedly is more specific for albumin (6, 7).

Using specimens from 31 normal laboratory personnel, we compared results by these two aca procedures and also the BCG procedure as used in the Technicon SMA-II continuous-flow analyzer. We also compared it with additional specimens with above-normal alpha- and beta-globulins as shown by electrophoresis on cellulose acetate. Total protein was determined with the biuret reaction, in the SMA-II. Both the aca and the SMA-II were standardized according to the manufacturers' recommendations. Our results for the 31 normal persons were:

<table>
<thead>
<tr>
<th>Method</th>
<th>Mean albumin, g/L range, g/L</th>
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<tbody>
<tr>
<td>aca-BCG</td>
<td>48 (3)</td>
</tr>
<tr>
<td>aca-BCP</td>
<td>43 (4)</td>
</tr>
<tr>
<td>SMA-BCG</td>
<td>41 (3)</td>
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</tbody>
</table>

The aca-BCG reaction gave consistently higher values, and our normal range was higher than the 38–48 g/L range given by the manufacturer. The means and normal ranges for the aca-BCP and SMA-II-BCG methods were more similar. The main differences between the SMA-II and aca-BCG methods are that in the SMA-II the reaction is at room temperature and a succinate buffer system as recommended by Dumas and Biggs (8) is used rather than the acetate buffer used in the aca. Both endpoints are read after about 4.5 min, while in the new BCP method the reaction time is 29 s, similar to that in rapid BCG methods (4). (The BCP dye is added in Breaker/Mixer II on the aca, while BCG was added at Breaker/Mixer I.)

For the group of 10 patients the aca-BCG method again consistently gave the highest values for albumin, with a mean of 38 (SD 6) g/L. The mean by the BCP method and electrophoresis was 30 g/L; the SMA-II-BCG method gave intermediate results, with a mean of 33 g/L. However, there was considerable intersubject variation in results by these methods. In six of these patients, the BCP results averaged 4 g/L higher than the electrophoresis results; for the other four the BCP method gave a lower value than electrophoresis (mean difference, 4 g/L). For these same four patients, the SMA-II-BCG method agreed well with electrophoresis in three (mean difference, 1 g/L), who also had the highest albumin/globulin ratios (as determined by electrophoresis) in the abnormal group. In the remaining patients, all with albumin/globulin ratios <0.8, the SMA-BCG method consistently yielded higher albumin values than did electrophoresis (mean difference, 6 g/L).

We conclude that the aca-BCP method is a significant improvement over the aca-BCG method. Both normal and abnormal populations give lower albumin values with the BCP method, probably because the dye is more specific for albumin, although the shorter reaction time cannot be excluded. Of the three methods, results by the BCP method agreed best with electrophoresis in patients with acute-phase reactants. However, even these few data
make it evident that results for individual patients by aco-BCP may not correlate well with electrophoresis. If a clinical situation warrants a highly accurate albumin determination, the more cumbersome electrophoresis or immunochemical procedures may still prove to be more desirable.

References

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Use or Abuse of the Fluorescence Polarization Measurement of Amniotic Fluid for Determination of Fetal Lung Maturity?

To the Editor:

Recently Barkai et al. (1) reported improved measurement of the fluorescence polarization (FP) of amniotic fluid (AF) for the determination of fetal lung maturity. On the other hand, I have expressed my reservations (2) concerning the interpretation of the results of FP measurements of AF. I would now like to bring the attention to a problem that may be solved if the method recommended by this group (3) for estimating fetal lung maturity by FP is to remain a part of the repertoire of the clinical chemist.

Although FP is a measure of the microviscosity of the whole lipid assembly of AF, these authors (3) showed that the changes in FP values of AF correlated significantly with the changes in egg lecithin/sphingomyelin ratio. However, Duck-Chong et al. (4) found that the lamellar body phospholipid content of AF is a better measure of fetal lung maturity than is the lecithin/sphingomyelin ratio. Thus one would expect that the FP of amniotic bodies would also better indicate fetal lung maturity than would the FP of whole AF. Unfortunately, this is not the case. Petersen and Birdl (5) have recently shown that the FP of the lamellar body fraction does not differ significantly from the non-lamellar (background) FP of AF. Furthermore, they showed that the FP of mixtures of dipalmitoyl lecithin/sphingomyelin increased if the amount of lecithin was increased, whereas for whole AF the opposite was true. More work is needed to explain this discrepancy.

References

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