exercise can cause a loss of potassium from the exercising muscle and result in an increased potassium value in blood collected from this forearm (1).

Using the Orion Space-Stat 30 for potassium measurements, we have investigated the magnitude of the potassium increase in the whole blood and its plasma when blood is collected with and without forearm exercise during venipuncture. For three healthy subjects with right forearm and fist motionless, a tourniquet was applied to the upper right arm; and a needle, attached to a barrel for blood collection into Vacutainers, was inserted into a superficial vein at the right elbow. Two Vacutainers (Becton-Dickinson No. 3200 KA) of blood were collected from each subject. During the period of time from the middle of collection of blood in tube 1 until removal and replacement of tube 1 in the barrel with tube 2, each of the three subjects opened and closed the right fist forcefully 10 to 15 times. For three other healthy subjects, the right forearm and fist were kept motionless throughout the entire blood collection procedure.

The results obtained are summarized below:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Before (Tube 1)</th>
<th>After (Tube 2)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without forearm exercise</td>
<td>4.29</td>
<td>4.28</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>3.99</td>
<td>3.91</td>
<td>-0.08</td>
</tr>
<tr>
<td></td>
<td>4.00</td>
<td>3.95</td>
<td>-0.05</td>
</tr>
<tr>
<td>With forearm exercise</td>
<td>4.00</td>
<td>5.08</td>
<td>+1.08</td>
</tr>
<tr>
<td></td>
<td>4.21</td>
<td>4.59</td>
<td>+0.38</td>
</tr>
<tr>
<td></td>
<td>4.52</td>
<td>5.03</td>
<td>+0.51</td>
</tr>
</tbody>
</table>

The potassium value for each sample represents the mean of duplicate determinations; for replicate analysis with n = 2, the CV was 0.4. Similar potassium values were obtained if plasma from the whole blood sample was assayed in place of the whole blood sample. In addition, for each subject, the difference between plasma potassium concentrations in tubes 1 and 2 was the same whether the Orion Space-Stat 30 or the IL 343 flame photometer (Instrumentation Laboratories, Inc.) was used for plasma potassium measurements. When the data were analyzed using small-sample statistics (the paired t-test) the difference between potassium in tubes 1 and 2 was found not to be significant (t = -2.30; P < 0.05) for subjects 1, 2, and 3 (without forearm exercise), but was significant (t = +3.06; P < 0.05) for subjects 4, 5, and 6 (with forearm exercise).

To accord with the findings of Skinner (1), our data demonstrate that even mild forearm exercise during venipuncture can result in a significant change in potassium value, which has implications in the assessment of potassium concentrations, especially in the borderline hypokalemic patient and in serum vs. plasma samples. Consequently, for the proper evaluation of reports on the determination of potassium in blood, we recommend that details of venipuncture should always be included in these reports.

Reference

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Semantics of “Accuracy” vs. “Inaccuracy”

To the Editor:
The Expert Panel on Nomenclature and Principles of Quality Control in Clinical Chemistry of the International Federation of Clinical Chemistry (IFCC) recently recommended the use of the terms “inaccuracy” and “imprecision” as a means of expressing the quality of analyses (1). According to IFCC, this change is made because “more precise methods have smaller standard deviations between replicate results; more accuracy is reflected in a smaller deviation of results from the true value. There is some linguistic awkwardness in this inverse relationship."

I find it difficult to accept the concept of describing a quality by negative terms. There can be misunderstanding if all test results are said to have a certain degree of “imprecision and inaccuracy.” A physician would feel much more comfortable to receive test results with a stated accuracy and precision than with a certain degree of inaccuracy and imprecision, even though both might mean the same thing. Clinical chemists must also be concerned with the psychological implications of our terminology.

We do not measure intelligence in terms of stupidity nor beauty in terms of ugliness. Then why should we measure the desirable analytical qualities such as the accuracy and precision in terms of inaccuracy and imprecision? Because I believe that it is better to retain the terms accuracy and precision to describe the quality of analyses, I would like to propose a method that would resolve the problem raised by the IFCC, namely the “linguistic awkwardness due to an inverse relationship,” without having to change the terminology.

Accuracy may be expressed in percentage the same way purity is expressed. If 5.0 g of a substance is found to contain 4.8 g of the analyte, then the purity = (4.8/5.0) × 100 = 96.0%. Similarly, if the mean analytical value is 4.8 g/dl and the true value is 5.0 g/dl, accuracy may be expressed as follows: Accuracy = (4.8/5.0) × 100 = 96.0%.

Precision also may be expressed in the same way, in percentage, as 100 − the coefficient of variation. If the CV is 1.0%, the precision of the analysis is 99.0%.

The only limitation of this method is that the concentration of the analyte must be specified along with accuracy and precision values, in order to make the information complete. This, of course, has been a problem in expressing SD and CV as well. A SD value of 2 mg/dl is incomplete unless one specifies the analyte concentration. We can overcome this difficulty by actually indicating the analyte concentration in parentheses. For example, a precision of 99.0% (150 mg/dl) would mean that at an analyte concentration of 150 mg/dl the CV for the analysis is 1.0%.

References

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Defect in the Method for 125I-Labeled Folate Radioassays

To the Editor:
In 125I-labeled folate radioassays, either ascorbic acid or mercaptoethanol is usually recommended as a preservative (1, 2).

We used the commercial kit of Clinical Assays Inc. (2) for the quantitative determination of serum folate, which incorporates the addition of two drops of a solution of mercaptoethanol in water (20 ml/dl). It was found that after storage at -20 °C for 24 h most of the sera (5 ml each) had coagulated (gelled) and the folate assay could not be performed. This phenomenon was observed when as little as 5.0 × 10^-7 mol of mer-

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