was also more variable than in the control group (mean, 1.19 vs 0.23). The interindividual variation in CRP in its natural log for both groups was similar, at 0.5. The critical difference between 2 consecutive CRP samples in an individual patient with PCOS, calculated using the formula 2.77(CV) \times (3) on the log-derived data, was ~64% or +79% of any initial variation of CRP. This indicates that a subsequent sample must increase by >179% or decrease by >64% to be considered significantly different from the first.

This is the first study to examine the biological variation of CRP in women with PCOS, and it shows that although the mean concentration of CRP is higher in individuals with PCOS compared with healthy controls, the intraindividual variation of CRP is similarly large in both groups. Indeed, the potential utility of CRP as a marker of cardiovascular risk may be limited by the magnitude of this variability in both health and disease, as there can be substantial overlap between PCOS and control individuals. Our control group data are in accord with results demonstrated by previous studies suggesting a similarly wide intraindividual variability in CRP of ~30%–40% (6–9). In contrast, Ockene et al. (10) have suggested that high-sensitivity CRP has a degree of measurement stability similar to that of total cholesterol, therefore providing evidence of potential clinical utility of high-sensitivity CRP screening as a tool for vascular risk prediction. This issue of clinical usefulness, therefore, has yet to be resolved.

The lack of concordance between the variability of CRP concentration and the variability of insulin resistance in PCOS, compared with the controls, indicates that despite the known inverse relationship, the magnitude of CRP changes in the same individual does not closely mirror that of insulin resistance. Therefore, an increased CRP concentration cannot be used as a direct surrogate marker to establish the presence of insulin resistance in this group. There has also been the assumption that, in patients with PCOS, CRP values may reflect the presence of the metabolic syndrome (11, 12); indeed it still might, but insulin resistance alone would not be the sole cause or the main factor. It seems more likely that CRP may reflect or be a marker of many factors that contribute to the syndrome.

References


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DOI: 10.1373/clinchem.2005.052753

Pseudocholinesterase Activity in Organophosphate Poisoning after Storage of Unseparated Blood Samples at Room Temperature for 3 Weeks

To the Editor:

Suppressed pseudocholinesterase activity is a well-established laboratory finding in patients with serious organophosphate poisoning (1). Recently, a 48-year-old man with suspected ingestion of methyl parathion died, and the postmortem examination was not indicative. After 3 weeks, an overlooked specimen was discovered that had been collected from the patient ~1 h after the suspected poisoning. The determination of pseudocholinesterase activity was requested. The blood sample, which showed complete hemolysis, was separated by centrifugation, and the pseudocholinesterase activity was determined. The result of 4.21 kU/L indicated the presence of only minor organophosphate poisoning without suppression of pseudocholinesterase activity.

Data regarding pseudocholinesterase activity in unseparated blood after storage at room temperature are rare, however, with the longest reported duration (48 h) showing only negligible differences (2). Because one would expect enzyme activities to be extensively changed after storage for 3 weeks at room temperature, we performed a limited study with
samples from 10 randomly selected patients that had been submitted for the determination of pseudocholinesterase activity as part of our daily routine. Additionally, samples from 3 patients with serious organophosphate poisoning (parathion, patients 11 and 13; methylparathion, patient 12) were included. Blood samples were collected in Monovette plastic tubes. One part of each sample was immediately centrifuged for 10 min at 2000 g and 4 °C, and the pseudocholinesterase activity was measured by the colorimetric Roche Diagnostics® assay performed on a Hitachi 917 instrument. This test is based on the catalysis of butyrylthiocholine iodide to thiocholine and butyrate and is indicative of pseudocholinesterase activity (reference interval, 5.30–12.90 kU/L). The remaining portion of each sample was stored in a closed box at room temperature for 3 weeks. After this period, the samples were processed as described above and the pseudocholinesterase activity was measured.

As shown in Table 1, the pseudocholinesterase activity in the samples from randomly selected patients was decreased by a mean of 17.8 (4.3)% (maximum difference, +12.3%; median difference, −17.8%; minimum difference, −30.4%). Furthermore, we found no evidence for spontaneous in vitro recovery of pseudocholinesterase activity after storage at room temperature for 3 weeks; the activities in samples from the poisoned patients remained very low.

On the basis of this limited study, we conclude that the measurement of pseudocholinesterase activity in blood samples stored unseparated for several weeks at room temperature may still yield reasonable results for forensic questions. We are aware that, for forensic purposes in cases of organophosphate poisoning, the number of specimens collected from patients in our study was very limited. However, these poisonings are rare at our poison unit; a total of 9 patients were treated from January 2003 to December 2004. Furthermore, samples from 7 of these patients showed completely suppressed pseudocholinesterase activity (≤0.1 kU/L), and only 2 patients had measurable values (0.39 and 1.30 kU/L) at presentation.

In view of the present findings, serious poisoning in the above case seems to be unlikely. However, another explanation for the missing suppression of pseudocholinesterase activity could be that parathion was not yet activated to paraoxon 1 h after the suspected poisoning.

Table 1. Pseudocholinesterase activity in samples from randomly selected patients (patients 1–10) and patients with organophosphate poisoning (patients 11–13) initially and after 3 weeks of storage at room temperature.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age, years</th>
<th>Sex</th>
<th>Pseudocholinesterase activity, a kU/L</th>
<th>Difference, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>39</td>
<td>Male</td>
<td>5.67 (4.44)</td>
<td>−21.7</td>
</tr>
<tr>
<td>2</td>
<td>47</td>
<td>Male</td>
<td>9.82 (8.1)</td>
<td>−17.5</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>Female</td>
<td>4.28 (2.98)</td>
<td>−30.4</td>
</tr>
<tr>
<td>4</td>
<td>64</td>
<td>Female</td>
<td>1.77 (1.88)</td>
<td>+6.2</td>
</tr>
<tr>
<td>5</td>
<td>55</td>
<td>Male</td>
<td>3.26 (3.67)</td>
<td>+12.3</td>
</tr>
<tr>
<td>6</td>
<td>56</td>
<td>Male</td>
<td>5.47 (4.48)</td>
<td>−18.1</td>
</tr>
<tr>
<td>7</td>
<td>52</td>
<td>Female</td>
<td>5.66 (4.94)</td>
<td>−12.7</td>
</tr>
<tr>
<td>8</td>
<td>50</td>
<td>Male</td>
<td>5.71 (4.65)</td>
<td>−18.6</td>
</tr>
<tr>
<td>9</td>
<td>75</td>
<td>Female</td>
<td>3.17 (2.63)</td>
<td>−17.0</td>
</tr>
<tr>
<td>10</td>
<td>40</td>
<td>Male</td>
<td>11.48 (8.48)</td>
<td>−26.1</td>
</tr>
<tr>
<td>Mean (SE)</td>
<td>52.8 (3.4)</td>
<td></td>
<td>5.63 (0.95) (4.63 (0.69)</td>
<td>−17.8 (4.3)</td>
</tr>
<tr>
<td>11</td>
<td>76</td>
<td>Male</td>
<td>0.34 (0.27)</td>
<td>−20.1</td>
</tr>
<tr>
<td>12</td>
<td>32</td>
<td>Male</td>
<td>0.07 (0.05)</td>
<td>−28.6</td>
</tr>
<tr>
<td>13</td>
<td>70</td>
<td>Female</td>
<td>0.15 (0.09)</td>
<td>−40.0</td>
</tr>
</tbody>
</table>

*Reference interval, 5.30–12.90 kU/L.

References

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DOI: 10.1373/clinchem.2004.045468