Increased Acid Phosphatase Activity in Prostate secretion Associated with Prostatic Carcinoma, W. A. Fournard, J. V. Straumfjord, L. Persky, M. A. Helal, and P. R. Foulis 1 (1 Dept. of Pathol. and 2 Dept. of Surgery, James A. Haley V.A. Hosp. and The University of South Florida, Tampa, FL)

Twenty-five patients with obstructive urinary symptoms attributed to enlargement of the prostate were evaluated y using digital prostatic massage to obtain prostate secrecrons. The activity of acid phosphatase (EC 3.1.3.2) in the secretion was measured in an attempt to correlate the quantitutive activity with the presence of prostate carcinoma. Urine was obtained immediately before and after massage. To measure acid phosphatase activity in the post-massage specimen, we used the thymolphthalein phosphate hydrolysis of Roy et al. (1), with an acs* discrete analyzer (DuPont, Wilmington, DE). Creatinine was meaured in pre- and post-massage specimens to determine to what extent the prostate secretion was contaminated with urine, based on the fact that pure prostatic secretion is void of creatinine (2). The corrected prostatic secretion of acid phosphatase activity (CPACP) was obtained from the following formulas: percentage urine contamination = post-massage creatinine/pre-massage creatinine) × 100; CPACP = 100 × (measured post-massage acid phosphatase)/(100 – percentage urine contamination).

The patients had the following documented tissue diagnoses: 13, adenocarcinoma of the prostate, ranging from stages A to D; 11, glandular and stromal hyperplasia; and 2, no tissue abnormality. Nine of the 13 carcinoma patients (69%) had acid phosphatase activity >35 kU/L (true positive); three had acid phosphatase activity >100 kU/L (false negative) and stage A1 carcinomas. One case as diagnosed after consultation with the Armed Forces Institute of Pathology.

Of the 12 patients with benign disease, 11 (91%) had acid phosphatase activity >35 kU/L (true negatives), nine of which were >100 kU/L. With 35 kU/L as an arbitrary cutoff point below which carcinoma can be suggested (Fig. 1), the test had a sensitivity of 72.9%, a specificity of 99%, a positive predictive value of 89%, and a negative predictive value of 77%. The predictive value was higher in patients with stages B through D only (positive predictive value 100%, negative predictive value 92%). These observations refute the assumption that acid phosphatase activity would be increased in prostatic secretion in patients with carcinoma. The potential use of this test to screen patients with carcinoma of the prostate warrants further investigation.

References

Artifactually High Concentration of Iron Determined in Serum from a Patient with a Monoclonal Immunoglobulin, Andries J. Bakker and Marjo J. Kohthman-Tijkotte (Dept. of Clin. Chem. and Nursing Home, Medical Centre Leeuwarden, P.O. Box 850, 8901 BR Leeuwarden, The Netherlands)

An 84-year-old woman presented with a fracture of the femur neck, for which she got a Hasting prosthesis. Afterwards she did not do well and could not be mobilized adequately, because she frequently fell. Despite further measures to reactivate her, her condition was worsening. Biochemical analysis showed a slight anemia and, surprisingly, an extreme result of 148 μmol/L for the concentration of serum iron (reference range: 10–30 μmol/L). Further analysis of the serum of this patient revealed a concentration of total protein of 69 g/L (reference range: 60–80 g/L). Finally, protein electrophoresis showed a monoclonal spike of 15 g/L, which was identified as IgG-lambda by immunofixation electrophoresis.

The serum iron had been determined with a Hitachi 717 analyzer, by the procedure recommended by Boehringer Mannheim, involving ferrozine in acetate buffer (prod. no. 1040890; acetate 133 mmol/L, pH 5.5; ferrozine 2.5 mmol/L; detergents and ascorbic acid were also present). The method had been modified, to prevent the effect of carryover of total protein reagent, by addition of thiourea (66
mmol/L) to the buffer (1).

Figure 1 shows the absorbance pattern of this reaction in the serum of the patient, together with the absorbance patterns of a standard and of serum from a "normal" patient. Re-analysis of the sample after a threefold dilution with saline resulted in a determination of serum iron of 6 μmol/L (corrected for the degree of dilution). The monoclonal protein obviously influenced the determination of serum iron, probably by a gradual precipitation during the measuring interval. Therefore, we replaced the acetate buffer with a guanidine/acetate buffer (guanidine 3.5 mol/L; acetate 117 mmol/L; pH 5.0; thiourea 78 mmol/L; ferrozine 2.5 mmol/L; and ascorbic acid), because guanidine is known to prevent precipitation of proteins (2). Re-analysis of the patient's sample with this buffer also resulted in a low concentration of serum iron, 7 μmol/L. To verify this finding, we also re-analyzed the sample by the procedure recommended by the International Commission for Standardization in Hematology, in which proteins are removed by precipitation with trichloroacetic acid (3). By this procedure the concentration of serum iron was 9 μmol/L.

Although we regularly find normal or even low results for serum iron in patients with monoclonal immunoglobulins, our findings in the serum of this patient suggest that sometimes precipitation of the monoclonal immunoglobulin can be responsible for an artifactual high result for serum iron determinations in patients with monoclonal gammopathy. The interference described here for the Hitachi method for serum iron is also likely to occur in other procedures in which these kinds of reagents are used.

References


The availability of immunoturbidimetric methods that are easily adaptable to automated assay systems has been an important development in the provision of robust assay for slight ("micro")albuminuria, an important predictor of diabetic nephropathy (1).

We have evaluated the AlbuSure QNT kit (Cambridge Life Sciences, Cambridge, U.K.), and have used this method routinely for two years with a Hitachi 704 analyzer (Boehringer Mannheim, Mannheim, F.R.G.). The reagents were used as supplied by the manufacturer with instrument settings as shown below. In addition, we have developed assays for total protein [pyrogallol red method (2)] and creatinine in undiluted urine, which can be performed simultaneously with the turbidimetric albumin assay, with use of the following settings:

<table>
<thead>
<tr>
<th>Assay type</th>
<th>Albumin</th>
<th>Creatinine</th>
<th>Total protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read points</td>
<td>Two point</td>
<td>Rate A</td>
<td>One-point</td>
</tr>
<tr>
<td>Sample vol, μL</td>
<td>10–32</td>
<td>22–26</td>
<td>32</td>
</tr>
<tr>
<td>Reagent 1 vol, μL</td>
<td>350</td>
<td>100*</td>
<td>500</td>
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<tr>
<td>Reagent 2 vol, μL</td>
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<td>80</td>
<td>—</td>
</tr>
<tr>
<td>Wavelength (1st/2nd)</td>
<td>700/340</td>
<td>570/505</td>
<td>600</td>
</tr>
</tbody>
</table>

* Hi-Co reagent diluted on machine.

All assays were precise (albumin: 28 mg/L, CV 4.3%; creatinine: 7.2 mmol/L, CV 3.7%; total protein: 450 mg/L, CV 4.4%) and accurate, as assessed with commercially assayed quality-control material.

To demonstrate the effect of increasing albumin concentration on this assay system, we increased the sample size while keeping the reagent volume constant. This initially caused a loss of linearity, but further addition of albumin was accompanied by a decrease in the measured albumin (Figure 1).

Fig. 1. Depresson of measured albumin when the proportion of albumin is increased by altering the sample size: ○ = 5 μL; ■ = 10 μL; ▲ = 20 μL.