VMA and HVA excretion by 29 patients with neural crest tumors. From these data, we offer preliminary observations on the validity of applying our procedure to the investigation of patients suspected of having a neural crest tumor.

Column maintenance: The useful life of the column can be approximately doubled by adopting the following procedure for column maintenance. At the end of each working day, wash the column successively with 20 mL of each of the following: de-ionized water; 1-heptanesulfonic acid (Eastman Kodak), 2 mmol/L in phosphate buffer (70 mmol/L, pH 4.8); de-ionized water; and, finally, methanol. Strict adherence to this procedure increases column life to about 10 weeks, or 300 analyses.

Reference ranges: Table 1 lists 95th and 100th percentile reference values for urinary excretion of VMA and HVA. The values for HVA are very similar to those recently reported by other investigators (2, 2). Those for VMA are similar to those reported by de Schaeppdryer et al. (2), but are appreciably lower than those reported by Haymond et al. (4), who used the method of Pisanò et al. (5).

Patients with neural crest tumors: We measured urinary VMA and HVA excretion in 15 patients with neuroblastoma and 16 patients with pheochromocytoma (Table 2). A comparison with the reference values in Table 1 shows that VMA excretion (in mg/24 h) by all 31 of the patients exceeded the 100th percentile value—i.e., there was no overlap in VMA excretion between individuals with and without neural crest tumors. These data contrast markedly with those recently published by Bravo et al. (6), who reported that urinary VMA, as measured by the Pisanò method, afforded a sensitivity of only 50% in their population of 22 patients with pheochromocytoma. Although various factors, including the propitious timing of sample collection, may account to some extent for this difference in sensitivity, we believe the method of analysis and selection of appropriate reference values to be the most important factors.

Measuring HVA excretion (in mg/24 h) was of no value in identifying patients with pheochromocytoma and was marginally less useful than VMA in confirming the presence of a neuroblastoma. Although all neuroblastoma patients had HVA values exceeding the 95th percentile, the 100th percentile was exceeded in only 14 of 15 such patients.

Use of untimed urine specimens: The difficulties, especially in children, of obtaining accurately timed urine collections are well known, and prompted us to establish reference ranges for VMA and HVA excretion in untimed urine specimens, normalized by expressing results in terms of milligrams per gram of creatinine (Table 1). The data obtained from patients with neural crest tumors were then recalculated in these concentration units (Table 2).

VMA excretion, so expressed, exceeded the 100th percentile in all patients with pheochromocytoma, and in 14 of 15 patients with neuroblastoma. The result for the other patient with neuroblastoma lay between the 95th and 100th percentiles.

Such recalculation of HVA excretion data did not make this a more useful test for the detection of pheochromocytoma.

Table 2. VMA and HVA Excretion by Patients with Neural Crest Tumors

<p>| Table 2. VMA and HVA Excretion by Patients with Neural Crest Tumors |
|------------------------|-----------------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th>Age, years</th>
<th>VMA (mg/24 h)</th>
<th>HVA (mg/24 h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 6</td>
<td>50</td>
<td>9.5</td>
</tr>
<tr>
<td>≥ 6</td>
<td>100</td>
<td>19.0</td>
</tr>
</tbody>
</table>

All neuroblastoma patients continued to show HVA values exceeding the 95th percentile, but only 13 of 15 had values exceeding the 100th percentile, one less than previously.

We appreciate the data for these patients, having been obtained from analyses on timed urine collections, are not strictly comparable to reference-value data obtained on untimed specimens. Nevertheless, we believe the data indicate that the risk of missing a patient with a neural crest tumor is greater if measurements of VMA and HVA are performed in untimed rather than timed urine specimens.

References


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Normal Range for the Third Component of Complement by Solid-Phase Immunofluorescence

To the Editor:

Our laboratory performed a normal range study for the third component of complement (C₃) as measured by a solid-phase immunofluorescence technique (FIA™). Serum samples were collected from 84 individuals undergoing pre-employment physical examinations at our central Pennsylvania institution. To minimize variables the same technologist performed all assays with reagent of the same lot number from International Diagnost Technology (IDT).

The range of values obtained was 0.64

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Table 1. Percentile Reference Values for Urinary VMA and HVA Excretion

<table>
<thead>
<tr>
<th>Age, years</th>
<th>VMA (mg/24 h)</th>
<th>HVA (mg/24 h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 6</td>
<td>50</td>
<td>9.5</td>
</tr>
<tr>
<td>≥ 6</td>
<td>100</td>
<td>19.0</td>
</tr>
</tbody>
</table>

* Analyses performed on timed urine samples obtained from patients under investigation for hypertension.

b Analyses performed on untimed urine specimens obtained from hospital patients not suspected of having a neural crest tumor.

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to 2.03 g/L, with a normal (gaussian) distribution. The mean was 1.27 g/L, the SD 29.21. Our calculated ±2 SD range was 0.69 to 1.85 g/L. The suggested normal range from IDT of 1.08–2.08 g/L was obtained from data on a representative population from northern California (1).

A literature search provided one reference (2) to a normal range study by this method for C3; the reported range was 0.72–1.70 g/L. This study was performed in the Erie, Pennsylvania, and Buffalo, New York, areas. Our range is similar to their range. Perhaps there is a regional difference in normal C3 concentrations.

We, as well as IDT, encourage individual laboratories to perform their own normal range studies.

References

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Clinical Evaluation of Two Thyrotropin Radioimmunoassay Kits: Human Serum Matrix Calibrators and Bovine Serum Matrix Calibrators

To the Editor:

We have evaluated a new thyrotropin (TSH) radioimmunoassay (RIA) kit with TSH-free normal human serum (NHS) as a calibrator matrix (21) NHS-TSH RIA Kit”; Diagnostic Products Corp., Los Angeles, CA 90045], comparing results with those obtained with the TSH kit originally offered by Diagnostic Products Corp., in which bovine serum is the calibrator matrix (21-1-TSH RIA KIT”).

The main features of the new kit include a calibration curve of 0–60 milli-int. units/L, a 200-μL sample requirement, two 2-37°C incubation steps, and use of a one-step precipitating solution of polyethylene glycol–isotonic saline–goat anti-rabbit gamma globulin to separate the free and bound fractions.

The average total binding (bound/

![Fig. 1. Serum thyrotropin (TSH) values for normal subjects, persons taking birth-control pills, pregnant women, and hypothyroid and hyperthyroid subjects, as measured with kits involving TSH-free normal human serum-based calibrators (left) or bovine serum-based calibrators (right). Normal range shaded.](image)

Table 1. Precision of the Analysis for Serum TSH (milli-international units/L)

<table>
<thead>
<tr>
<th>Calibrators</th>
<th>in human matrix</th>
<th>in bovine matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>x</td>
<td>SD</td>
</tr>
<tr>
<td>Within-run</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>3.9</td>
<td>0.15</td>
</tr>
<tr>
<td>20</td>
<td>22.1</td>
<td>0.59</td>
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<tr>
<td>Between-run</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>6.3</td>
<td>0.40</td>
</tr>
<tr>
<td>13</td>
<td>12.5</td>
<td>0.90</td>
</tr>
<tr>
<td>17</td>
<td>41.0</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Our data indicate significant differences in results with the new and old RIA kits and that a revised normal range must be established. The increased analytical sensitivity has also provided increased clinical sensitivity, especially in cases of hyperthyroidism.

References