Test Definition: METAR
Metanephrines, Fract., Random, U

Overview

Useful For
A second-order screening test for the presumptive diagnosis of pheochromocytoma in patients with nonepisodic hypertension

Confirming positive plasma metanephrine results in patients with nonepisodic hypertension

Profile Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Reporting Name</th>
<th>Available Separately</th>
<th>Always Performed</th>
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</thead>
<tbody>
<tr>
<td>RCTU</td>
<td>Creatinine Conc</td>
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<tr>
<td>METAU</td>
<td>Metanephrines, Fractionated, U</td>
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<td>Yes</td>
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</table>

Method Name
RCTU: Enzymatic Colorimetric Assay
METAU: Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) Stable Isotope Dilution Analysis

NY State Available
Yes

Specimen

Specimen Type
Urine

Specimen Required

Supplies: Urine Tubes, 10 mL (T068)

Patient Preparation: Tricyclic antidepressants and labetalol and sotalol (beta blockers) may elevate levels of metanephrines. If clinically feasible, these medications should be discontinued at least 1 week before collection.

Collection Container/Tube: Clean, plastic urine collection container

Submission Container/Tube: Plastic urine tube

Specimen Volume: 5 mL

Collection Instructions:

1. Collect a random urine specimen.
2. No preservative.
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**Forms**

*If not ordering electronically, complete, print, and send an Oncology Test Request* (T729) with the specimen.

**Specimen Minimum Volume**

3 mL

**Reject Due To**

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

**Specimen Stability Information**

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
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<tbody>
<tr>
<td>Urine</td>
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<td></td>
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<tr>
<td></td>
<td>Ambient</td>
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</tr>
<tr>
<td></td>
<td>Frozen</td>
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**Clinical and Interpretive**

**Clinical Information**

Pheochromocytoma is a rare, though potentially lethal, tumor of chromaffin cells of the adrenal medulla that produces episodes of hypertension with palpitations, severe headaches, and sweating ("spells").

Pheochromocytomas and other tumors derived from neural crest cells (eg, paragangliomas and neuroblastomas) secrete catecholamines (epinephrine and norepinephrine).

Metanephrine and normetanephrine are the 3-methoxy metabolites of epinephrine and norepinephrine, respectively. Metanephrine and normetanephrine are both further metabolized to vanillylmandelic acid.

Pheochromocytoma cells also have the ability to oxymethylate catecholamines into metanephrines that are secreted into circulation.

While screening for pheochromocytoma is best accomplished by measuring plasma free fractionated metanephrines (a more sensitive assay), follow-up testing with urinary fractionated metanephrines (a more specific assay) may identify false-positives. Twenty-four hour urine collections are preferred, especially for patients with episodic hypertension; ideally the collection should begin at the onset of a "spell."

**Reference Values**

**METANEPHRINE/CREATININE**

Normotensives

0-2 years: 82-418 mcg/g creatinine
3-8 years: 65-332 mcg/g creatinine
9-12 years: 41-209 mcg/g creatinine

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13-17 years: 30-154 mcg/g creatinine
> or =18 years: 29-158 mcg/g creatinine

NORMETANEPHRINE/CREATININE

Males
Normotensives
0-2 years: 121-946 mcg/g creatinine
3-8 years: 92-718 mcg/g creatinine
9-12 years: 53-413 mcg/g creatinine
13-17 years: 37-286 mcg/g creatinine
18-29 years: 53-190 mcg/g creatinine
30-39 years: 60-216 mcg/g creatinine
40-49 years: 69-247 mcg/g creatinine
50-59 years: 78-282 mcg/g creatinine
60-69 years: 89-322 mcg/g creatinine
> or =70 years: 102-367 mcg/g creatinine

Females
Normotensives
0-2 years: 121-946 mcg/g creatinine
3-8 years: 92-718 mcg/g creatinine
9-12 years: 53-413 mcg/g creatinine
13-17 years: 37-286 mcg/g creatinine
18-29 years: 81-330 mcg/g creatinine
30-39 years: 93-379 mcg/g creatinine
40-49 years: 107-436 mcg/g creatinine
50-59 years: 122-500 mcg/g creatinine
60-69 years: 141-574 mcg/g creatinine
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> or =70 years: 161-659 mcg/g creatinine

TOTAL METANEPHRINE/CREATININE

Males
Normotensives

0-2 years: 241-1,272 mcg/g creatinine
3-8 years: 186-980 mcg/g creatinine
9-12 years: 110-582 mcg/g creatinine
13-17 years: 78-412 mcg/g creatinine
18-29 years: 96-286 mcg/g creatinine
30-39 years: 106-316 mcg/g creatinine
40-49 years: 117-349 mcg/g creatinine
50-59 years: 130-386 mcg/g creatinine
60-69 years: 143-427 mcg/g creatinine
> or =70 years: 159-472 mcg/g creatinine

Females
Normotensives

0-2 years: 241-1,272 mcg/g creatinine
3-8 years: 186-980 mcg/g creatinine
9-12 years: 110-582 mcg/g creatinine
13-17 years: 78-412 mcg/g creatinine
18-29 years: 131-467 mcg/g creatinine
30-39 years: 147-523 mcg/g creatinine
40-49 years: 164-585 mcg/g creatinine
50-59 years: 184-655 mcg/g creatinine
60-69 years: 206-733 mcg/g creatinine
> or =70 years: 230-821 mcg/g creatinine
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Interpretation
Increased metanephrine and normetanephrine levels are found in patients with pheochromocytoma and tumors derived from neural crest cells.

Increased urine metanephrines can be detected in nonpheochromocytoma hypertensive patients; quantification may help distinguish these patients from those with tumor-induced symptoms.

Cautions
This test utilizes a liquid chromatography tandem mass spectrometry (LC-MS/MS) method and is not affected by the interfering substances that affected the previously utilized spectrophotometric (Pisano reaction) method (ie, diatrizoate, chlorpromazine, hydrazine derivatives, imipramine, monamine oxidase [MAO] inhibitors, methyldopa, phenacetin, ephedrine, or epinephrine).

This method is also not subject to the known interference of acetaminophen (seen with the plasma metanephrine HPLC-EC method)

When N-acetylcysteine is administered at levels sufficient to act as an antidote for the treatment of acetaminophen overdose, it may lead to falsely decreased creatinine results.

Clinical Reference


Performance
Method Description
Urinary metanephrines are determined by reverse phase liquid chromatography-tandem mass spectrometry (LC-MS/MS) stable isotope dilution analysis. Urinary metanephrines occur largely in conjugated form. After urine specimens are acidified and hydrolyzed for 20 minutes in a boiling water bath, metanephrine and normetanephrine are extracted from the specimens utilizing extraction cartridges. The metanephrine and normetanephrine are eluted from the cartridge using 20% methanol (MeOH) and analyzed by LC-MS/MS using multiple reaction monitoring in positive mode. Deuterated metanephrine (d3-metanephrine, 200 ng) and deuterated normetanephrine (d3-normetanephrine, 500 ng) are added prior to the hydrolysis as an internal standard. The following ion pairs are used for analysis: metanephrine, (180/148); normetanephrine, (166/134); d3-metanephrine, (183/151); d3-normetanephrine, (169/137). The metanephrine and normetanephrine concentrations are quantified using ratios.

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**PDF Report**

No

**Day(s) and Time(s) Test Performed**

Monday through Friday; 4 p.m.

**Analytic Time**

3 days (not reported on Sundays)

**Maximum Laboratory Time**

5 days

**Specimen Retention Time**

2 weeks

**Performing Laboratory Location**

Rochester

**Fees and Codes**

**Fees**

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

**Test Classification**

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

**CPT Code Information**

83835

**LOINC® Information**

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<td>RCTU</td>
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<td>21547</td>
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<td>Total Metanephrine/Creatinine</td>
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