Overview

Useful For
Monitoring serum concentration during therapy
Evaluating potential toxicity
The test may also be useful to evaluate patient compliance

Method Name
Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

NY State Available
Yes

Specimen

Specimen Type
Serum Red

Specimen Required

Container/Tube: Red top

Specimen Volume: 1 mL

Collection Instructions:
1. Draw specimen immediately before next scheduled dose (minimum 12 hours after last dose).
2. Serum must be separated from cells within 2 hours of draw.

Forms
If not ordering electronically, complete, print, and send a Therapeutics Test Request (T831) with the specimen.

Specimen Minimum Volume
0.25 mL

Reject Due To

<table>
<thead>
<tr>
<th>Gross hemolysis</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross lipemia</td>
<td>Reject</td>
</tr>
<tr>
<td>Gross icterus</td>
<td>Reject</td>
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</tbody>
</table>

Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Red</td>
<td>Refrigerated (preferred)</td>
<td>28 days</td>
<td></td>
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</table>
**Clinical and Interpretive**

**Clinical Information**

Amitriptyline is a tricyclic antidepressant that is metabolized to nortriptyline, which has similar pharmacologic activity. The relative blood levels of amitriptyline and nortriptyline are highly variable among patients. Amitriptyline is the drug of choice in treatment of depression when the side effect of mild sedation is desirable. Nortriptyline is used when its stimulatory side effect is considered to be of clinical advantage.

Nortriptyline is unique among the antidepressants in that its blood level exhibits the classical therapeutic window effect; blood concentrations above or below the therapeutic window correlate with poor clinical response. Thus, therapeutic monitoring to ensure that the blood level is within the therapeutic window is critical to accomplish successful treatment with this drug.

Amitriptyline displays major cardiac toxicity when the combined serum level of amitriptyline and nortriptyline is above 500 ng/mL, characterized by QRS widening, which leads to ventricular tachycardia and asystole. In some patients, toxicity may manifest at lower concentrations.

Like amitriptyline, nortriptyline can cause major cardiac toxicity when the concentration is above 500 ng/mL, characterized by QRS widening, which leads to ventricular tachycardia and asystole. In some patients, toxicity may manifest at lower concentrations.

**Reference Values**

**AMITRIPTYLINE AND NORTRIPTYLINE**

Total therapeutic concentration: 80-200 ng/mL

**NORTRIPTYLINE ONLY**

Therapeutic concentration: 70-170 ng/mL

**Note:** Therapeutic ranges are for specimens drawn at trough (ie, immediately before next scheduled dose). Levels may be elevated in non-trough specimens.

**Interpretation**

Most individuals display optimal response to amitriptyline when combined serum levels of amitriptyline and nortriptyline are between 80 and 200 ng/mL. Risk of toxicity is increased with combined levels are above 500 ng/mL.

Most individuals display optimal response to nortriptyline with serum levels between 70 and 170 ng/mL. Risk of toxicity is increased with nortriptyline levels above 500 ng/mL.

Some individuals may respond well outside of these ranges, or may display toxicity within the therapeutic range, thus, interpretation should include clinical evaluation.

Therapeutic ranges are based on specimens drawn at trough (ie, immediately before the next dose).
Cautions
This test cannot be performed on whole blood. Serum must be separated from cells within 2 hours of drawing; if serum is not removed within this time, tricyclic antidepressant levels may be falsely elevated due to drug release from RBCs. Specimens that are obtained from gel tubes are also not acceptable, as the drug can absorb on the gel and lead to falsely decreased concentrations.

Clinical Reference


Performance

Method Description
The tricyclic antidepressants are extracted from serum using a solvent crash to precipitate proteins. The supernatant is remove and analysis is by liquid chromatography-tandem mass spectrometry (LC-MS/MS). (Unpublished Mayo method)

PDF Report
No

Day(s) and Time(s) Test Performed
Monday, Wednesday, Friday; Varies

Analytic Time
2 days

Maximum Laboratory Time
4 days

Specimen Retention Time
14 days

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**
80335
G0480 (if appropriate)

**LOINC® Information**

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<th>Test Order Name</th>
<th>Order LOINC Value</th>
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<tbody>
<tr>
<td>AMTRP</td>
<td>Amitriptyline and Nortriptyline, S</td>
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<table>
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<tbody>
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<tr>
<td>36755</td>
<td>Nortriptyline</td>
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<tr>
<td>36756</td>
<td>Amitriptyline and Nortriptyline</td>
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