Overview

Useful For
Measuring rivaroxaban concentration in selected clinical situations (eg, renal insufficiency, assessment of compliance, periprocedural measurement of drug concentration, suspected overdose, advanced age and extremes of body weight)

Special Instructions
- [Coagulation Guidelines for Specimen Handling and Processing]

Method Name
Chromogenic Assay

NY State Available
Yes

Specimen

Specimen Type
Plasma Na Cit

Advisory Information
This assay is not indicated for monitoring low-molecular-weight heparin (LMWH) or unfractionated heparin (UFH) concentrations. The presence of UFH and LMWH will cause the rivaroxaban anti-Xa level to be falsely elevated.

Necessary Information
If priority specimen, mark request form, give reason, and request a call-back.

Specimen Required

Specimen Type: Platelet-poor plasma

Collection Container/Tube: Light-blue top (3.2% sodium citrate)

Submission Container/Tube: Plastic vial

Specimen Volume: 1 mL

Collection Instructions:
1. Specimen should be drawn 2 to 4 hours (peak) after a dose or just prior (trough) to the next dose for rivaroxaban concentrations.

2. For complete instructions, see [Coagulation Guidelines for Specimen Handling and Processing] in Special Instructions.

3. Centrifuge, transfer all plasma into a plastic vial, and centrifuge plasma again.

4. Aliquot plasma into a plastic vial leaving 0.25 mL in the bottom of centrifuged vial.
5. Freeze plasma immediately (no longer than 4 hours after collection) at -20 degrees C or, ideally, < or =-40 degrees C.

Additional Information:

1. A double-centrifuged specimen is critical for accurate results as platelet contamination may cause spurious results.

2. Each coagulation assay requested should have its own vial.

Forms

If not ordering electronically, complete, print, and send a Coagulation Test Request (T753) with the specimen.

Specimen Minimum Volume

0.5 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>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma Na Cit</td>
<td>Frozen</td>
<td>42 days</td>
<td></td>
</tr>
</tbody>
</table>

Clinical and Interpretive

Clinical Information

Rivaroxaban, an oral anticoagulant that directly inhibits factor Xa, has been approved by the FDA for prophylaxis of thrombosis in atrial fibrillation and surgical patients and treatment of venous thromboembolism (VTE). Unlike warfarin, it does not require routine therapeutic monitoring. However, in selected clinical situations, measurement of drug level would be useful (eg, renal insufficiency, assessment of compliance, periprocedural measurement of drug concentration, suspected overdose, advanced age, and extremes of body weight).

Plasma Concentrations of Rivaroxaban in Patient Populations Studied(1)

<table>
<thead>
<tr>
<th>Patient population/clinical setting</th>
<th>Rivaroxaban dose</th>
<th>C-min (ng/mL)a trough plasma conc (predose)</th>
<th>C-max (ng/mL)b peak plasma conc (2-4 hours postdose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTE prevention after total hip replacement surgery</td>
<td>10 mg once daily</td>
<td>9 (1-38)</td>
<td>125 (91-196)</td>
</tr>
<tr>
<td>DVT treatment (continued treatment)</td>
<td>20 mg once daily</td>
<td>26 (6-87)</td>
<td>270 (189-419)</td>
</tr>
</tbody>
</table>
**Test Definition: RIVAR**

Rivaroxaban, Anti-Xa, P

**Stroke prevention in patients with non-valvular AF (CR-CL > or =50 mL/min)**

<table>
<thead>
<tr>
<th>Dosing</th>
<th>Median (5th-95th percentile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 mg once daily</td>
<td>44 (12-137)</td>
</tr>
<tr>
<td>15 mg once daily</td>
<td>57 (18-136)</td>
</tr>
</tbody>
</table>

**Stroke prevention in patients with non-valvular AF (CR-CL 30-49 mL/min)**

<table>
<thead>
<tr>
<th>Dosing</th>
<th>Median (5th-95th percentile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 mg twice daily</td>
<td>17 (6-37)</td>
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</table>

**Secondary prevention in patients with acute coronary syndrome**

<table>
<thead>
<tr>
<th>Dosing</th>
<th>Median (5th-95th percentile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 mg once daily</td>
<td>44 (12-137)</td>
</tr>
<tr>
<td>15 mg once daily</td>
<td>229 (178-313)</td>
</tr>
</tbody>
</table>

Median (5th-95th percentile)

a Defined as samples collected 20-28 hours after dosing

b Defined as samples collected 2-4 hours after dosing

AF-atrial fibrillation, CR-CL-creatinine clearance, DVT-deep vein thrombosis, VTE-venous thromboembolism

**Reference Values**

<4 ng/mL

**Interpretation**

The lower limit of detection of this assay is 4 ng/mL.

Therapeutic reference ranges have not been established. See Clinical Information section for peak and trough drug concentrations observed from clinical trials.

**Cautions**

Routine monitoring of rivaroxaban is not indicated. Therapeutic reference ranges have not been established, however, peak and trough levels observed in clinical trials at different dosing are available. Rivaroxaban concentration may be affected by drug interactions and liver or renal disease.

Rivaroxaban levels measured within 2 to 4 hours after administration of andexanet may be falsely elevated with this assay.

**Clinical Reference**


**Performance**

**Method Description**

The rivaroxaban, anti-Xa assay is performed on the Instrumentation Laboratory ACL TOP 700 using the HemosIL Liquid Anti-Xa kit. The liquid Anti-Xa kit is a 1-stage chromogenic assay based on a synthetic chromogenic substrate and on factor Xa inactivation. Factor Xa is neutralized directly by rivaroxaban. Residual factor Xa is quantified with a synthetic chromogenic substrate. The paranitroaniline released is monitored kinetically at 405 nm and is inversely proportional to the rivaroxaban in the sample. (Package insert: HemosIL Liquid Anti-Xa kit. Instrumentation Laboratory Company, rev. 11/2011)

**PDF Report**

No

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

Monday through Friday

**Analytic Time**

1 day

**Maximum Laboratory Time**

3 days

**Specimen Retention Time**

7 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 has been modified from the manufacturer’s instructions. Its performance characteristics were 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**
### LOINC® Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
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</thead>
<tbody>
<tr>
<td>RIVAR</td>
<td>Rivaroxaban, Anti-Xa, P</td>
<td>74871-5</td>
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<table>
<thead>
<tr>
<th>Result ID</th>
<th>Test Result Name</th>
<th>Result LOINC Value</th>
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<tbody>
<tr>
<td>RIVA1</td>
<td>Rivaroxaban, Anti-Xa, P</td>
<td>74871-5</td>
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<tr>
<td>RIVA2</td>
<td>Interpretation</td>
<td>69049-5</td>
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<td>RIVA3</td>
<td>Cautions</td>
<td>62364-5</td>
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